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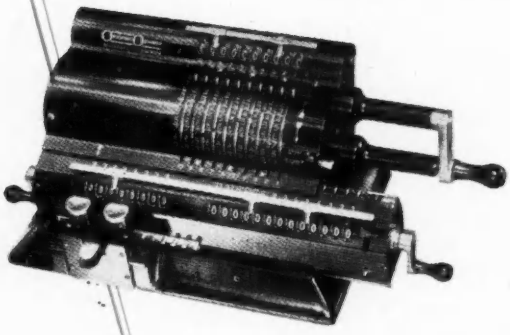

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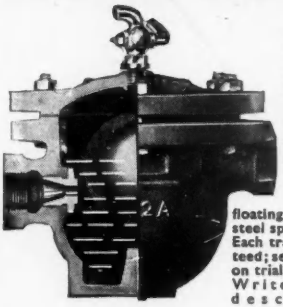

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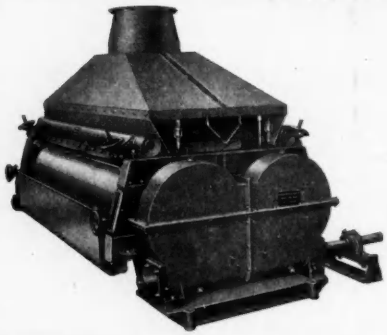

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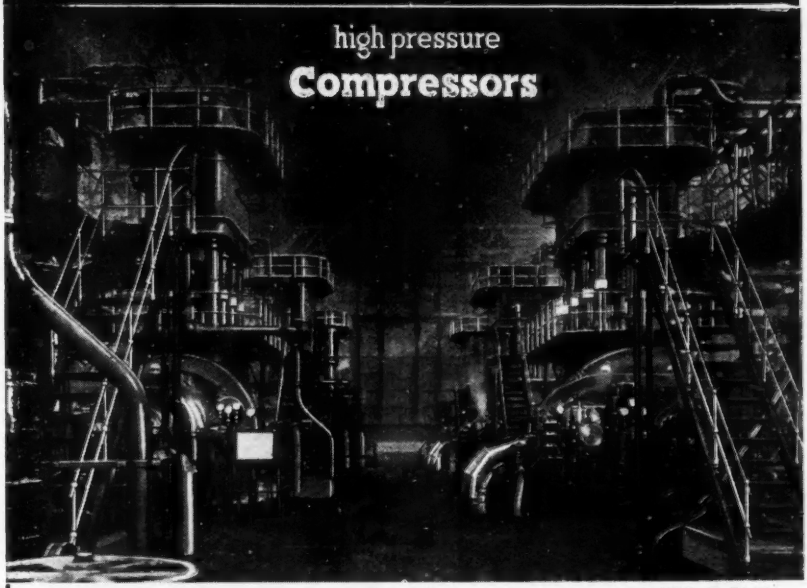

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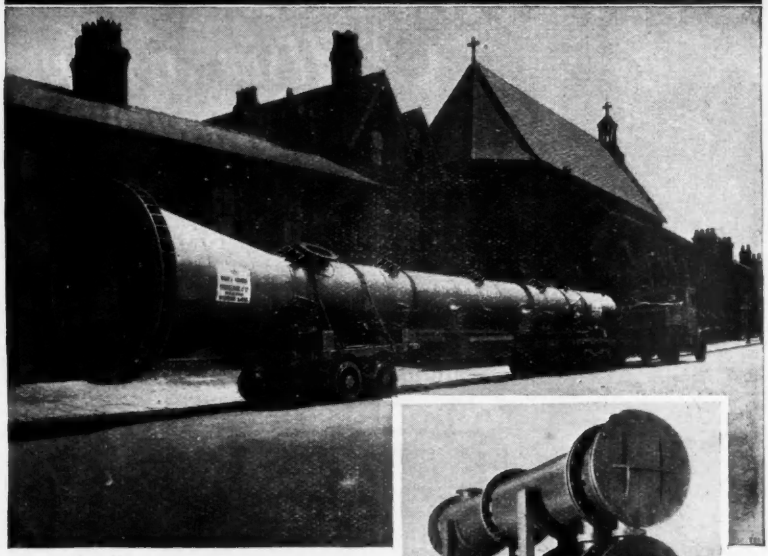

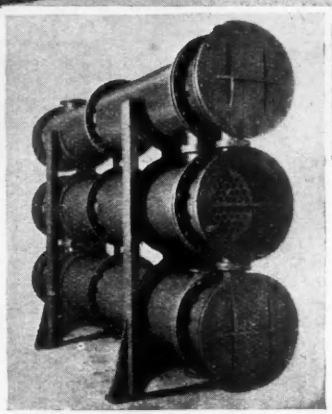

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The upper illustration shows a mild steel fractionating column 4′ 0″ inside diameter by 58′ 0″ overall height, the supporting cone flared to 8′ 10″ diameter in 10′ 0″. Approx. weight 12½ tons.

The inset illustration shows a three-tier horizontal heat exchanger in cast iron. Each shell is 20″ inside diameter and contains 66 copper tubes 1¼″ bore by 10′ 6″ in length.

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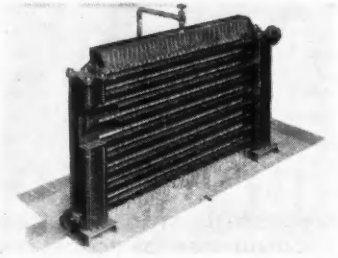

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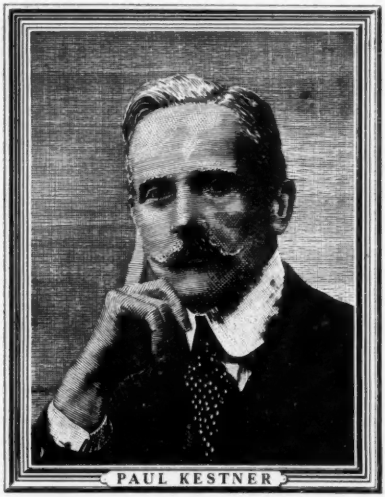

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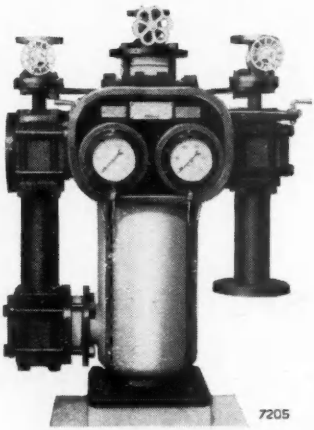

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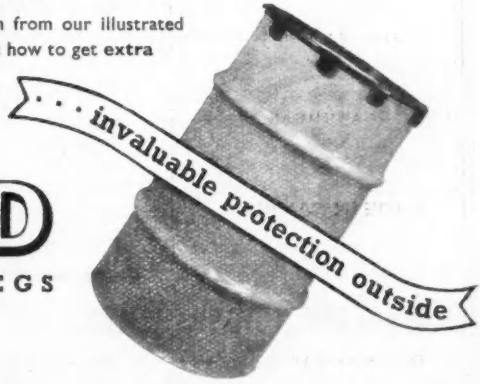

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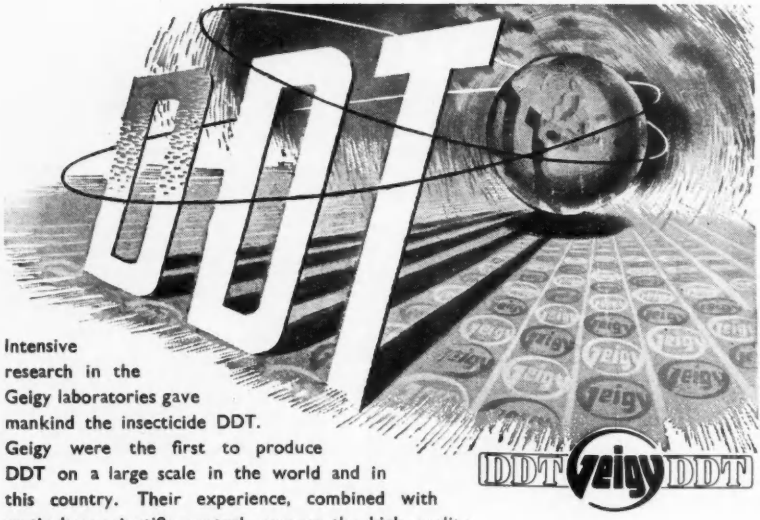

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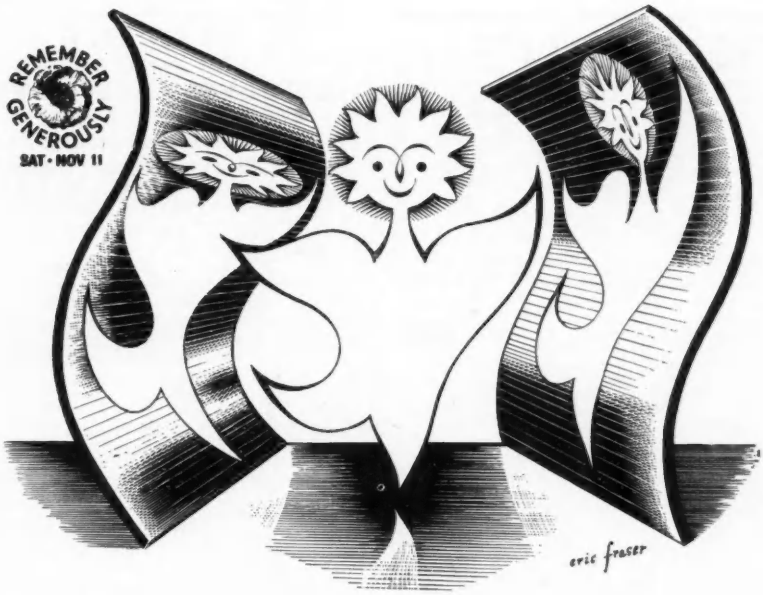

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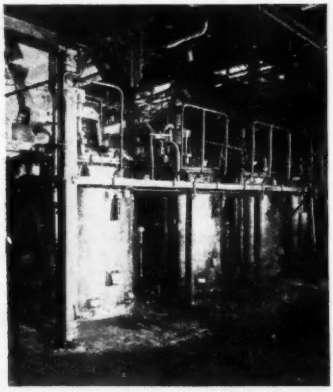

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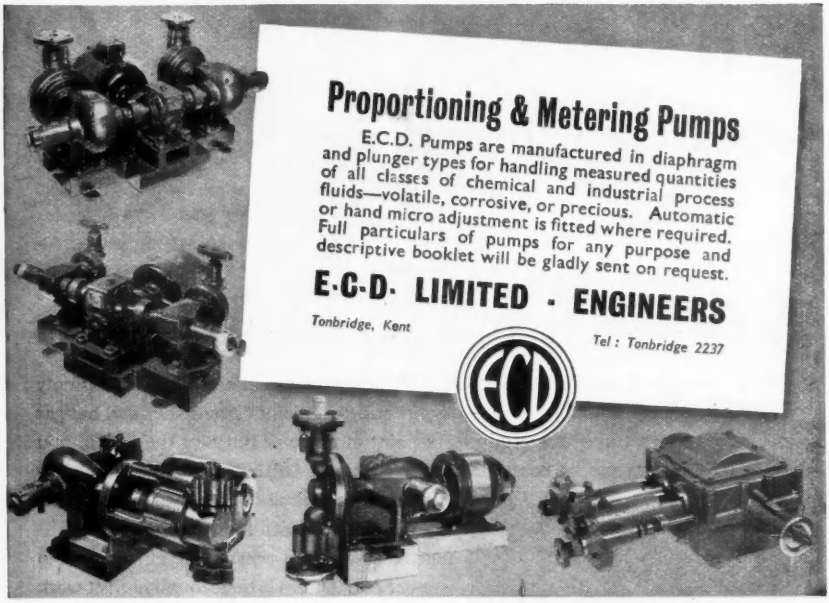
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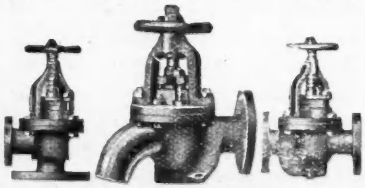

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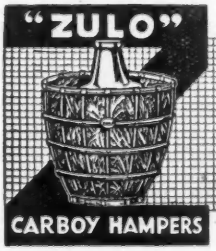

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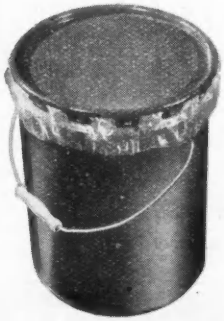

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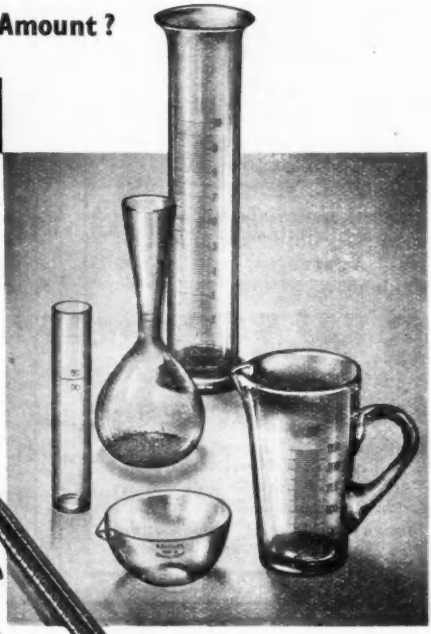

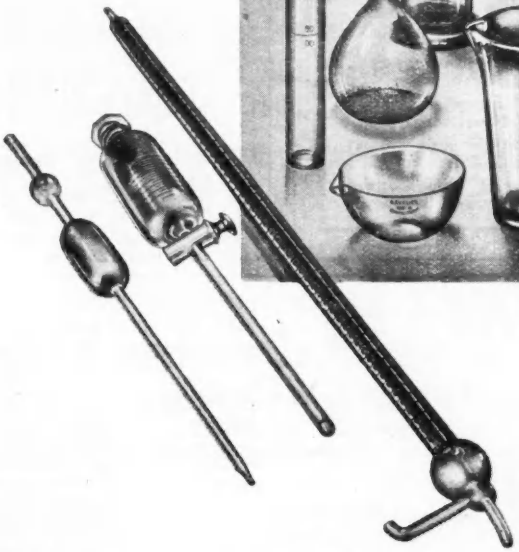

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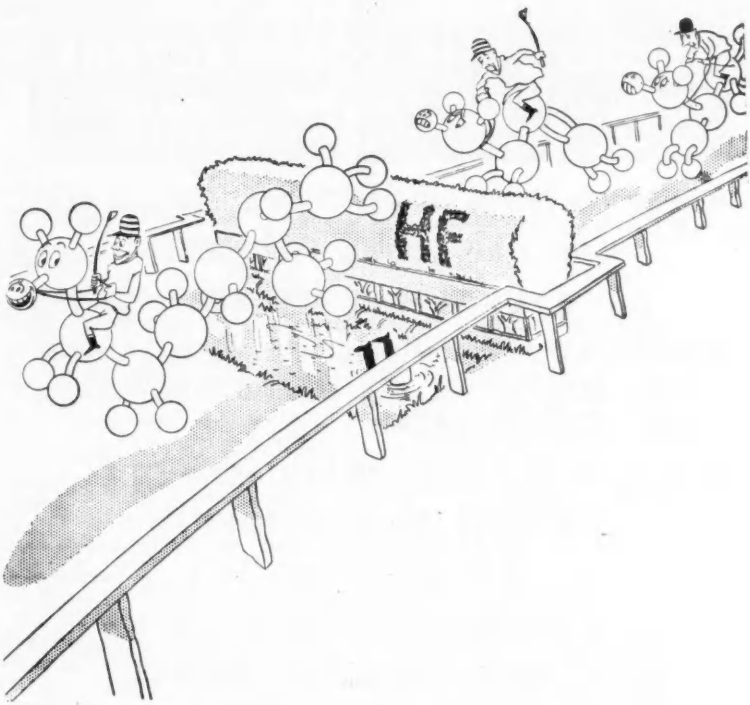

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Volume LXIII 4 November 1950 Number 1634

Anglo-American Abstracts?

A PROMISING proposal to simplify the formidable task of keeping abreast of the literature, which for many means reading at least American abstracts as well as the numerous publications of our own, is securing serious attention here and in the U.S.A. The proposal, by L. M. Miall in the form of a letter to the chemical Press (*Chemistry and Industry*, Sept. 5), has the virtues of simplicity and of complementing other contemporary policies reflecting the closer identification of British and American interests in technical and scientific affairs. It recommends a coalition between the British Abstracts Bureau and the American Chemical Society in the production of an Anglo-American abstracts service. The onerous responsibility of combing at least two wide fields of literature—often as a "spare time" activity—is not peculiarly a British problem. That is recalled by the fact that the argument has now been reproduced in the American *Chemical and Engineering News* (*28*, 3291).

Mr. Miall stresses the melancholy fact that both abstracting bodies, in this country and in America, are working at a heavy loss and in 1949 a deficit of £13,500 in Great Britain and $246,076 in the U.S.A.—despite some stringent economies; and there is rapidly increasing difficulty in finding competent staff numerous enough to deal with the great mass of chemical and allied literature. That obdurate problem has been made all the harder to resolve by the great extension of research since it was "demobilised" and the corresponding proliferation of the literature, periodicals, patents, reports and miscellanea. The increased activity in all kinds of abstracting and information services by individual firms and organisations, has led to a deplorable amount of overlapping so that the overwhelmed chemist and the high cost of classified summaries both plead for relief.

The American and British abstracts, as Mr. Miall has pointed out, cover much the same ground, and there is a tendency by firms to use one or the other, but not both. In addition to the two national abstracting services there are, of course, others, more or less sectional, including the joint or co-operative undertakings of the metallurgical and electrical engineering and physics bodies, respectively, both of which touch applied chemistry at many points. It is one of the primary duties of the scientific and technical associations to give members a competent information and abstract service, and many large firms, having their own independent abstracting and library

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The annual subscription to THE CHEMICAL AGE is 30s. single copies, 9d.; post paid, 1s.; SCOTTISH OFFICE 116 Hope Street, Glasgow (Central 3970). MIDLANDS OFFICE: Daimler House, Paradise Street, Birmingham (Midland 0784-5). THE CHEMICAL AGE offices are closed on Saturdays in accordance with the adoption of the five-day week by Benn Brothers, Limited

staff, use outside abstracts to check and amplify their own work. The difficulties have been discussed, at ASLIB conferences and elsewhere, almost *ad nauseam*.

The main question now is the possibility of some form of international collaboration, of which an Anglo-American alliance may be the first step. There are plenty of precedents in the technical-scientific field for such collaboration in other forms. Its extension to the abstracting realm may indeed become unavoidable if costs and other difficulties continue to multiply. For the average chemist and for most chemical firms the desideratum will be the capacity of a combined abstracts service to give a better and especially a quicker survey at a lower cost. Another important consideration would be the accuracy of assessment of the value of the material offered. U.S. Chemical Abstracts claims that its survey covers more than 5000 periodicals, but quantity is certainly not the best criterion. The great modern increase in the volume of published material has not been accompanied by an equivalent improvement in quality.

It is incontestable that the value of information is doubled if prompt, yet the time lag before some work appears in abstract form is occasionally preposterous. There have been many instances when the interval has amounted to more than two years. It should not be particularly hard, with British and American organisation, to avoid delays of anything like that magnitude.

Whether mechanical aids in library and information work will help to ease the problems which crowd in this particular field is another matter, but is of almost equal interest. There have been remarkable claims during the past year or two. The "Whirlwind documentary engine" or Doken, described at the last meeting of the American Chemical Society by C. M. Mooers, of the Zator Company, was at all events a possibility, even if it has not been realised. That "would be able to search the entire Library of Congress in 10 seconds, select all information on a given subject, and print selected abstracts at the rate of 10 per minute". Another, described at the same meeting by Mr. Coile, of the Massachusetts Institute of Technology, is an extention of the pre-war Vannever Bush "Rapid Selector". These, however, are still visions. Mr. Miall's plan is on a substantially more practical plane. It calls only for intelligent co-ordination of what we have already.

Notes and Comments

Chemists' Productivity Team

WITH the departure on Wednesday this week of the first team from chemical industry to study some aspects of American production methods a new stage, and potentially the most promising, is reached in the series of exchanges sponsored by the Anglo-American Council on Productivity. Judging by the reserve shown by the Productivity Council and others concerned with securing the invitation from the U.S. drugs and pharmaceutical industry—which has at the moment more to impart than any equivalent body outside this country—the negotiations have not been easy. The extent to which the engaging "open house" hospitality shown to others among the 32 teams which have made similar tours will be extended to the chemical team is still subject for speculation. The terms of reference are not too clearly defined, possibly because much will depend upon the communicativeness or its reverse of the various host industries. If, as seems likely, the Englishmen will have to confine themselves to a study of the latter stages of processing of pharmaceutical products and their packaging the experience may still prove to be of the utmost value. Those aspects alone comprise quite enough subject matter to occupy experts very much longer than the short duration of the team's programme in the U.S.A. The use of labour saving methods of final processing and packaging is fortunately a theme which British experts are well qualified to study with critical appreciation, having themselves achieved some remarkable accelerations, such as the Cellophane packaging of penicillin cartons at the rate of 30—instead of three—a minute.

Achievements in Adversity

THE British delegation, in meeting their American counterparts in the next few days, need have no reason to feel diffident about their own achievements, and not merely in such things as mechanical techniques. Theirs is, in fact, one of the very few industries whose almost spectacularly progressive research departments still operate without outside help of any kind, official or otherwise. American respect for sturdy private enterprise will probably appreciate more fully than it is appreciated here the force of one observation made at the recent general meeting of the Association of British Pharmaceutical Industry. It drew attention to the immense amount of unaided pharmaceutical research carried on by private enterprise here, and affirmed that the industry was, in fundamental discoveries, on equal terms or ahead of its foreign competitors. Meanwhile it was being handicapped in developing its research by the numerous restrictions imposed on industries and the most onerous burden of taxation imposed anywhere. The Americans, if asked, could no doubt proffer what would seem to them a simple solution of those problems.

Tin and Aluminium

THE disagreeable foretaste which tin has provided of the runaway prices which the essential metals so readily attain when buying is spurred on by eagerness to secure supplies ahead has enforced some anxious speculation regarding the future status of other categories in the non-ferrous group. Tin's rise to little short of a thousand pounds a ton (£980 on Wednesday) in the course of an ascent which has lasted several weeks has underlined the hazards and current costing perplexities of many non-ferrous metal users. It has also invited some anxious speculation on the part of the very much more numerous buyers of the other metals, of which aluminium is gaining prominence, partly because it is so conspiciously a strategic material. News from all over the world tends to confirm the same story—that all the widespread schemes to increase aluminium production capacity may

not keep pace with the mounting demand, which moves much faster than reduction plants can materialise.

America's "Immense Demand"

THE great expansion of production which the possibility of aluminium shortage has stimulated in North America holds little prospect of relieving the situation here should the anticipated shortage of aluminium for domestic production develop. Added to the shortage of Canadian dollars is a new factor which may prevent our making fuller use of the growing Canadian sources of the metal —the confident expectation that the U.S.A. will monopolise most of the increase. Canadian authorities, having just authorised a hydro-electric development requiring $30 million for the Aluminium Company of Canada, are looking forward with confidence to supplying more than $75 million worth of products to help satisfy the U.S.A.'s "particularly immense demand" for aluminium. The superlatives applied to current American needs seem to be justified, in the light of news received from our New York correspondent this week. It points to the likelihood that the U.S. Government will initiate a $500 million programme to raise aluminium production by 1000 million lb. a year to secure a total of around 2400 million lb. annually by mid-1952. Present rated capacity is thought to be around 1400 million lb. of pig and ingot. That proposal, with which the Aluminum Co. of America, Reynolds Metals and the Kaiser Aluminum & Chemical Corporation are expected to be associated, illustrates the American view of what the future is likely to require. It will, unfortunately, contribute nothing to arrest the scramble for aluminium which growing rearmament programmes may intensify in the course of next year.

Old Names Die Hard

LONG ago, when many of the elements known to-day had still to be isolated and Mendeleeff had yet to launch his periodic classification upon an unsuspecting Russian Academy of Science, the naming of the new discoveries as they materialised seems to have been a pleasantly haphazard business. Frequently some outstanding property of the new substance helped the discoverer to designate his brain child with a name which would itself convey something characteristic of the element. They had the inestimable advantage of unfettered use of the Greek language. Chloros—green—describes chlorine gas pretty well, though perhaps a little lacking in imagination. It was, however, a distinct improvement on "dephlogisticated marine acid air" or even the relatively terse oxymuriatic acid. Tempers may occasionally have become ruffled, as when a gas declined to exhibit any affinity for the other elements and was deservedly dubbed "argon," which gives a hint of the original frustration. This, however, is nothing to the frustration that may exist in a few years if the nomenclature of the elements becomes a rigid thing, with its own system and laws—and exceptions. So far, it must be admitted, there has been no rush to conform to last year's recommendations by the Commission on Inorganic Nomenclature. "Why upset the present system?" ask the chemists. The well-known names serve their purpose as well as any others, and the rest do not concern many of us anyway. There does not, for example, seem to be any urgent argument in favour of re-adopting the name "wolfram" for tungsten. Tungsten has come to stay, even if W must be its symbol. The argument that the uninitiated can guess Al for aluminium and U for uranium, but not Hg, Sb, (or W!), etc., seems rather pedantic. Let the chemist retain some of his rapidly diminishing esotericism. Everyone loves a secret, and the chemist is no exception.

Training in Iron Founding

Recruits to the iron founding industry needed more technical education to give them the right background, said Mr. S. H. Russell, chairman of the trustees of the National Foundry Craft Training Centre which was opened last week at West Bromwich. The centre provides a comprehensive training syllabus and should prove a help to greater productivity.

FIRST CHEMICAL PRODUCTIVITY TEAM

Ten to Study U.S. Pharmaceutical Industries

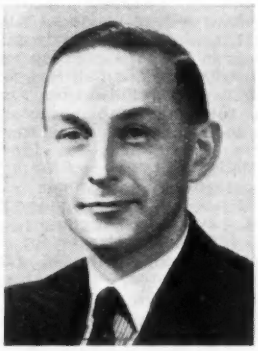
THE first productivity team drawn from the chemical industry—disregarding the recent tour by the fertiliser group—left for the U.S.A. last Wednesday. This was the pharmaceutical team sponsored by the Association of British Chemical Manufacturers, the Association of British Pharmaceutical Industry and the Association of Chemical and Allied Employers.

The visit has been arranged by the Anglo-American Council on Productivity under the technical assistance provisions of the Marshall Plan.

The team will spend between five and six weeks in America investigating compounding or processing (mixtures, solutions, etc.), tableting, bottling, ampouling, sterilisation and packaging—in short, all operations, subsequent to the manufacture of the essential chemicals, necessary to prepare pharmaceutical products for the market. It has the following 10 members representative of management, technicians and workpeople:—

Supervisory Level:—H. G. ROLFE, pharmaceutical director, British Drug Houses, Ltd. (Team leader); W. C. J. COUGHTREY, factory manager, Glaxo Laboratories, Ltd.; G. R. PAGE, manager, pharmaceutical laboratories, Evans Medical Supplies, Ltd.

Technicians:—JAMES BRENNAN, superintendent in charge of pharmaceutical processing, Imperial Chemical Industries, Ltd.; L. G. MURPHY, pharmacist, Burroughs, Wellcome & Co.; H. SMITH, draughtsman-section leader, Imperial Chemical Industries, Ltd.; R. E. LEWIS, manager, production control, Evans Medical Supplies, Ltd. (Team secretary); W. A. WOODWARD, head of pharmacy unit, research and development division, Glaxo Laboratories, Ltd.



Mr. H. G. Rolfe

Workshop Level:—W. J. LEDSHAM, checker, Evans Medical Supplies, Ltd. (member of the Union of Shop, Distributive & Allied Workers); W. T. IRVING, fitter chargehand, Imperial Chemical Industries, Ltd. (a member of the Amalgamated Engineering Union).

The team will make a report on its findings, which will be obtainable from the associations and the Anglo-American Council on Productivity (U.K. Section).

Twice as Many Chemical Engineers before 1954

ENGLISH universities in 1954 will be training 100 per cent more chemical engineers, yet that will not satisfy the estimated demand by industry. This is the principal conclusion, not entirely unexpected, presented on Wednesday in the report of the chemical engineering panel of the Ministry of Labour's Technical Personnel Committee. Having fully surveyed the engineering field—chemical and allied industries, chemical plant manufacture, gas, oil, coal and Government departments, the special sub-committee estimates that the supply of qualified chemical engineers from all sources between 1950 and 1954 will number only about 1100. The minimum requirements of industries within the same period may be 1300, so that universities and diploma courses, etc., may be expected to fulfil only about 85 per cent of the demand.

In its recommendations to relieve the shortage the sub-committee places its reliance upon the universities, in the setting up of strong chemical engineering departments, provided the general shortage of teachers and of students of the right calibre can be eliminated. While it feels four years' post graduate study for practioners is desirable, the experts agree that it is not impossible to qualify in three post-graduate years.

RISING CHEMICAL IMPORTS

Latest Total Nearly £1m. more than in September, 1949

SEPTEMBER imports of chemicals, drugs, dyes and colours, valued at £2,852,727, again showed nearly £1 million increase over the corresponding month of 1949 (£1,905,849). The figure is, however, more than £280,000 smaller than the August total. Notable increases in relation to the equivalent figure a year ago, were: Boric acid £34,916 (£6540), borax £74,962 (£1837), fertilisers £36,197 (£3), potassium compounds £687,831 (£568,050), sodium compounds £204,046 (£70,630), synthetic organic dyestuffs £114,638 (£67,840), extracts for tanning (solid and liquid) (£138,136 (£52,253), essential oils, other than turpentine £359,304 (£194,059), sulphur £373,207 (£93,428), plastics materials £450,383 (£307,857). A conspicuous reduction was represented by the total value of imported gas and chemical machinery, which in September was £12,440, against £117,823 in the corresponding month last year.

	Sept., 1950	Sept., 1949
	Cwt.	Cwt.
Acetic anhydride	12,527	11,055
Boric acid	12,540	3,420
Carbolic acid	1,485	—
Value of all other sorts of acid ...	£60,783	£53,035
	Cwt.	Cwt.
Borax	47,900	1,000
Calcium carbide	—	1
Cobalt oxides	268	614
	Tons	Tons
Fertilisers	4,020	—
	Lb.	Lb.
Glycol ethers and glycol ether-esters	787,036	1,016,817
Iodine	42,941	151,391

	Cwt.	Cwt.
Potassium chloride	832,656	675,058
Potassium sulphate	21,300	33,398
All other potassium compounds	24,516	2,666
Value of all potassium compounds	£687,831	£568,050
	Cwt.	Cwt.
Sodium nitrate	60,020	60,000
All other sodium compounds ...	28,653	6,544
Value of all sodium compounds	£204,046	£70,630
Value of chemical manufactures, etc., all other sorts	£796,481	£468.898
	Cwt.	Cwt.
Synthetic organic dyestuffs ...	1,738	764
Extracts for dyeing	1,250	988
Extracts for tanning (solid or liquid)	60,051	24,629
All other dyes and dyestuffs ...	254	77
Earth colours (except black) ...	15,309	16,392
Carbon blacks from natural gas	31,302	44,160
Value of carbon blacks ...	£130,233	£143,068
	Cwt.	Cwt.
Other blacks, including vegetable, lamp, acetylene and bone	15,198	9,671
Value of paints and extenders ...	£288,623	£226,844
Value of chemicals, drugs, dyes and colours	£2,852,727	£1,905,849
	Lb.	Lb.
Essential oils (other than turpentine)	341,696	281,326
Value of essential oils	£359,304	£194,059
	Lb.	Lb.
Synthetic oils	4,800	1,293
	Cwt.	Cwt.
Mineral jelly	16,549	6,556
Wax petroleum: paraffin wax	62,950	24,673
Value of oils, fats and resins ...	£11,991,492	£8,660,658
	Tons	Tons
Sulphur	37,895	12,225
Value	£373,207	£93,428
	Cwt.	Cwt.
Gas and chemical machinery ...	601	7,884
Value	£12,440	£117,823
	Cwt.	Cwt.
Plastics materials	24,526	10,307
Value	£450,383	£307,857

Merits of Flame Spectrometry

THE attractions of the uses of the flame spectrometer, although somewhat limited in the determination of content of rocks and minerals were discussed at a recent meeting at Poole, Dorset, organised by the Physical Methods Group of the Society of Public Analysts in collaboration with the local section of the Royal Institute of Chemistry.

Simpler Method

One of the papers (G. H. Osborn, F.R.I.C., A.M.Inst.M.M., and H. Johns, B.Sc.) dealt with the simplification of means of determining quickly sodium and potassium contents. The chemical method, it was observed, was a tedious process requiring experience and skilled technique.

The preferred alternative, the determination of sodium and potassium by means of a flame spectrometer, was applicable, at present, only to those rocks and minerals which were rendered soluble by combinations of various acids. The determination of the sodium and potassium in the acid solution was extremely simple and rapid; standardisation was by the internal standards technique.

The time taken for the determination of these elements in a rock or mineral should not exceed half-an-hour. If considerable quantities of the other alkalis or alkaline earths were present, those could be determined at the same time.

Wider Scope for Synthetic Detergents

New U.S. Developments — U.K. Applications Reviewed

NEW soapless soaps, which are stated to remove dirt, bacteria, and unpleasant smells and promise to have wide application in the home and in industry, have been developed in joint research in the U.S.A. This was disclosed at a recent meeting of the American Chemical Society.

The new chemically stable synthetic detergents are said to be ten times as effective as any known deodorant. In industries where obnoxious odours are produced the use of these detergents should prove effective. The detergents retain their disinfecting qualities in all operations.

In the germicidal field the new detergents can be used in solution and also as solid powders or pellets. In pellet form, when dissolved in a given quantity of water, they will produce a strong germicidal solution.

Another property of these new types of invert soaps is their stability and compatibility with diluted as well as concentrated acids. In acidic solutions they show detergent and cleansing properties of a high order. Detergent properties in strongly acid solutions are highly desirable in numerous types of large-scale heavy industrial and communication equipment, such as in the cleansing of ships, locomotives and coaches. The new soaps' emulsifying powers in acidic solutions suggest use in organic chemical operations where expensive and inflammable solvents are at present necessary.

The new detergents, morpholinium alkyl sulphates, are crystalline, odourless, and non-sticky.

THE autumn session of the London and South Eastern Counties section of the Royal Institute of Chemistry commenced this year with a meeting on Thursday, September 21, at the Gravesend Technical College. The meeting was opened by Dr. C. W. Herd, the section chairman, supported by the honorary secretary, Dr. K. G. A. Pankhurst.

Mr. J. S. Meredith spoke on "Some Practical Applications of Detergents."

Mr. Meredith outlined the growth of the detergent industry and the functions of detergents from the oldest soaps to the newest synthetic products. He pointed out that the new products could be divided into three types—anionic, cationic and non-ionic, and that the molecular structure could be adjusted to meet the various needs of diverse industrial applications.

While by far the greatest application of detergents is in the textile industry, Mr. Meredith gave a very comprehensive account of applications to other industries which are of considerable local interest, such as cement manufacture, paper manufacture, brewing, engineering, etc., and a host of general uses, including laundry work, the preparation of cosmetics, and fire fighting. In view of the undoubted advantages of "soapless soaps", particularly in hard water districts, the manufacturers had no fear of the future. Mr. Meredith very effectively proved his point that there is hardly any industry in the country which now does not make some use of these synthetic materials, with considerable advantage to its productive capacity.

Chilean Nitrate Problems

INCREASED production in Tarapaca has been promised by the Nitrate Corporation of Chile, in view of the Government assistance in helping to arrange finance in the U.S.A. for the necessary additional plant and equipment. Higher production costs and reduction of nitrate prices to meet synthetic competition may call for further Government aid if the nitrate industry is to continue at its present rate of production. The evaporation plant at Tocopilla is to be completed by next June by the Anglo-Chilean and Lautaro companies. The plant will cost $4\frac{1}{2}$ million and is planned to produce 50,000 tons of nitrates yearly.

Increasing Canadian Oil Output

CANADA's crude oil and natural gas output reached a peak total of 12,498,255 bls. in the first half of this year, showing an increase of 27 per cent over the previous record of 9,812,595 bls. established in the corresponding period of 1949. The output of Alberta Province accounted for 11,782,870 bls., which compared with 9,169,908 bls. in 1949. Production of refined oil products was 18 per cent higher in April and the first four months of this year than in the corresponding periods of 1949. The month's output was 6,937,027 bls. (5,867,875 bls. in 1949) and the first four months 27,951,911 bls.

PARLIAMENTARY TOPICS

PARLIAMENTARY authority has been granted to extend the period during which the Government can make use of patented inventions for the services of the Crown and associated services without recourse to further agreements with the owners of such patents. The President of the Board of Trade, Mr. Harold Wilson, said that the need for an extension (the period of which was not specified) was because they apply not only to defence production purposes, but also to the needs of the export drive, the maintenance of supplies and services and the provision of machinery designed to increase the country's productivity in agriculture, industry and housing.

THE President of the Board of Trade said he was prepared to consider any proposals by the paint, synthetic resin and allied industries for improving the present system of allocation to them of glycerin.

AUREOMYCIN was already being imported from the U.S.A. and the import of terramycin would be considered if the need arose, said the Minister of Health, Mr. Aneurin Bevan.

IN reply to a further question by Commander A. H. P. Noble, Mr. Harold Wilson confirmed that steps had been taken by the governments concerned to make as effective as possible the control of strategic items, such as molybdenum, in the country of origin, where the first responsibility lay.

EFFECT of NATIONALISATION

IF the Iron and Steel Act went through, as intended by the Government, two of the subsidiary companies of Thos. W. Ward, Ltd.—The Wolverhampton Steel & Iron Co. (1946), Ltd., and Birchley Rolling Mills, Ltd.—would be taken over, said Mr. George Wood (chairman) to shareholders at the 47th ordinary general meeting. Everything that had happened up to the present in State-owned and nationalised industry was a tale of woe with astronomical losses, losses which could only be paid for by reductions in standards of living, recalled Mr. Wood.

The relations between men and the new masters had been worse than anything under free enterprise. A sense of frustration in both management and men was widespread and had resulted in unofficial strikes and in general resentment of trade union control. Wages were high but the unrest in industry was clear evidence that no benefit had been obtained from the higher wages nor could such benefit ever be attained unless production was increased. Such an increase was an impossibility under State control.

He found it hard to believe that the people of this country had so far lost their self-reliance and virility as complacently to accept the general policy of nationalisation of all industry, particularly when there was such overwhelming evidence that compulsion of business by the State meant compulsion of the workmen by the State.

No Blackouts

WHATEVER failings may have been observed in the House of Commons' handling of national problems of electricity supply, its provision for its own re-built chamber ensures that "production" will not be at the mercy of public current supplies.

Any danger of blackout through power failure or other reasons has been eliminated. 216 pilot lights have been provided in the chamber, division lobbies, corridors, exits and lifts. All have a secondary source of supply from an emergency battery on the Keepalite system.

The battery, consisting of 122 Chloride Plante sealed-in type cells with a capacity of 180 a.h. at the 10-hour rate, is able to supply a load of more than 10 kW at 240 volts for three hours. When the main supply is interrupted, the secondary lighting load is changed to the battery by an automatic switch.

To ensure accurate time-keeping during mains failures or periods of abnormal mains supply frequencies the 166 electric clocks are operated from a master clock and supplied by a chloride battery of 25 cells with a capacity of 20 a.h. at the 10 hour rate. All batteries are maintained on a trickle charge.

£1m. for Nuclear Research

The Department of Scientific and Industrial Research is to spend £1 million on nuclear research at British universities, it was stated in Glasgow last week by Dr. H. Buckley, chief of the department's office in Edinburgh. About £250,000 was being given by the department to Glasgow University in connection with the building of a synchroton.

TECHNOLOGICAL EDUCATION

Can Universities Serve All the Needs of Industry?

"LET me declare my bias. I am against the proposal to found a separate university of technology. I am therefore the more anxious to state fairly the serious arguments for it," said Lord Eustace Percy at the start of his lecture on "Technical Universities," given at a meeting of the education group of the Institute of Physics, in London on October 25.

The mere impulse to imitate America or Switzerland, he thought, could be ignored, as could the controversy as to whether in English universities students of arts and pure science mixed sufficiently with students of technology to make university association between them a reality. It was simply not true to say that existing universities would be swamped by technological students if they were to try to meet the full technological needs of industry.

The committee which bore his name did suggest that universities could not be reasonably expected to meet more than 45 per cent of the demand for professional engineers, estimating that demand at about 3000 a year. But the rough survey on which the Percy report was based was carried out in 1944 when no one foresaw the post-war growth of the universities. Since then, it had been seen that to double the output of university scientists in a few years had been an easier task than even the later Barlow committee imagined.

Preponderance of Arts

Between 1938 and 1949, the number of technological degrees granted by universities was, in fact, rather more than doubled, yet in the year 1948-1949 technological students still represented only 13 per cent of the total university student body as against 44 per cent for arts students. In the Newcastle division of the University of Durham the corresponding percentages were 27 for technological students and 25 for arts, and he honestly thought that the technological aspect had done the university no harm.

The serious argument for a new technological university was, he took it, the one which had been advanced by certain eminent scientists that the bias of scientific studies in the universities was towards pure research and that studies imbued with that bias could not be expected to develop the practical interests and the executive qualities of mind which were proper to technologists. The expulsion of technologists from existing universities would, therefore, have to be accompanied by a no less wholesale exodus of professors of pure science.

The argument did not contemplate any greater specialisation in technological training at the undergraduate stage. At that stage, he suggested training should be based on a much wider and deeper study of fundamental science than at present. In other words, the argument did not seem to contemplate any change of curriculum.

Teaching Problems

The scientists' emphasis on individual work tended to conflict with the team work by which all successful research was conducted to-day and always had been. A large proportion of the university graduates were keen to escape from the drudgery and the team work of the office or factory into some individual occupation. Without some alteration in the teaching of modern science, a large emigration to a technological university would be nearly impossible. First class teachers of science would not willingly go to a new institution, whether they were just serving science or just serving technology.

The teaching of technology presented a variety of problems, and it was difficult in this country to organise anything like the systematic exchange—possible in some countries—of teachers between the universities and industry, thus integrating university teaching with industrial training. A revolutionary university organisation, such as had been proposed, would tend to shirk the real issue. He thought experiments were best carried out in existing institutions.

Local Authorities

The Percy report recommended that a few technological colleges should be selected and turned into institutions of higher technology. He now knew it to be true that no such development could be hoped for so long as technological institutions were owned and run by local education authorities. Such a plan could not be administered by a municipal committee. They had only to compare the Royal College of Art when it was governed under his (Lord Percy's) jurisdiction and as it was now.

Balance in the universities was not a matter of numbers. There was no reason why a university should not double or treble its technological students while those in its art and other departments remained stationary. It should be borne in mind that industry did not only, or indeed chiefly, require good engineers or good metallurgists. Its chief demand to-day was probably for good physicists, and it would not thank the educationists for a policy which left the pure scientist to be trained in the academic atmosphere of university honours schools while removing the applied scientist to the more bracing climate of a technological institute.

Experience and Salary

The prejudice on the part of students against going in for technology rather than pure science was probably influenced by what he believed was the practice in many cases which permitted a science student of, say, five years' training to receive the salary of a fully experienced scientist, be he a physicist or chemist. If industry would require of applicants that they had had some experience of industry before receiving a fully qualified person's salary—without, of course, interfering with their university training—it would be better.

A number of scientists entered into the discussion which followed. This was opened by Lord Cherwell, who said he was in agreement with Lord Eustace Percy on one point—that expansion in technoligical education was required. But how was that expansion to be obtained? The way Lord Eustace Percy favoured was that expansion should take place in the existing universities, but he (Lord Cherwell) was completely unconvinced that anyone could truthfully say that the technological university was unnecessary. It existed, and functioned successfully, on the Continent, and because a man went to one of these institutions it did not follow that he must only work in applied science; he had been taught fundamental science as well.

There was a difference between the purely practical man and the pure theorist which should not exist. The aim of training should be a smooth marrying of the theoretical and the practical.

A speaker on the staff of Imperial College said they could not get the post-graduate students from industry. If they did find a man who was suitable to take a post-graduate course he was generally regarded as so important to industry that his employers would not release him.

Another speaker expressed the opinion that technology and the application of science in British industry to-day was not a jot behind America or any other country. He did agree, though, that an educated man—that was, a generally well educated man—made a better engineer, or a better applier of science. He agreed wth Lord Percy that it was desirable to devise a means of getting the closest possible liaison between the appliers of science and the fundamental scientists.

Grants Suggested

The suggestion was made by another speaker that the University Grants' Committee might do well to spend some of its funds in sending a man back to the university after he had spent some time in industry. The grant should be an ample one—one that would enable a married man with a home of his own and perhaps a family to leave industry for the time being. That would require something in the nature of a £600 a year fellowship.

Science and the Human Values

THE need to distinguish between science and technology was emphasised by Sir Lawrence Bragg, Nobel Prize winner and director of the Cavendish Laboratory, Cambridge, when he delivered the Radford Mather lecture of the British Association at the Royal Institution, London last week.

Sir Lawrence Bragg defined science as the pursuit of knowledge, and technology as the exploitation of such knowledge when a possible use for it had become clear. The present tendency to attack science, was therefore not really an attack on science itself, but on the uses to which scientific knowledge had been put.

It would be asked if the technological advances made possible by science brought us nearer the millenium, or were they the contents of a Pandora's Box which had released countless troubles upon mankind? Scientists today were forced to meet challenges which would not have concerned them a generation ago. Many men and women were wondering whether the benefits of science were not outweighed by the complications of life resulting from its application.

The new world, continued Sir Lawrence, was like a higher type of organism. What happened in one part more or less intimately concerned the whole. There must be a re-phrasing of values and this could only be done by an integration of the humanistic and the scientific outlook.

POLYVINYL RESIN AND LATEX

Production and Properties of New Resins and Dispersions

POLYVINYL materials came to the fore during the war and are finding sc many applications in such a variety of industries that manufacturers have never found it easy to produce all that is required. Polyvinyl resins and latices are now produced by two British companies, one of which, British Geon, Ltd., specialises exclusively in the vinyl field, using indigenous basic materials, at Barry, Glamorganshire. Evidence of the growth of demand for polyvinyl material is the fact that the size of the factory, which has been operating only for about 2½ years, has already been considerably increased, and pressure on the existing capacity is now urging the need for further extensions.

The company's research laboratories are engaged on a continuous programme, aimed at improving existing materials and techniques and developing new products. There is already in production a substantial range of polyvinyl materials and the introduction of further products is only limited by plant capacity. The resins produced are of two chemical types, the Geon 100 series being polymers of vinyl chloride and the Geon 200 series copolymers of vinyl chloride and vinylidene chloride.

Cooling and Polymerisation

Vinyl chloride is prepared commercially by the catalytic hydrochlorination of acetylene, both gases being derived from water, salt, coke and limestone. For convenient handling, the gaseous vinyl chloride is usually liquefied by cooling below its its boiling point of -13.8° C. The single molecules of vinyl chloride monomer are then polymerised under closely controlled conditions to form the longer chain molecules which constitute the polyvinyl chloride.

Among the most important properties of the Geon 100 series resins are thermal and light stability, toughness and chemical inertness, which have been proved in the course of comparative tests. The volume resistivity of a fully flexible Geon insulation compound measured at 20° C. by the BS 903 method can readily exceed 1×10^{14} ohm-cm. The high dielectric properties of Geon 101, and to some extent its general heat stability, are due to the purity of the material, which has been achieved by the care taken during manufacture to ensure minimum occlusion of electrolytes.

For many purposes this material has been found superior to natural rubber, since it is practically non-ageing, does not support combustion, is non-hydroscopic and is unaffected by ozone. It is highly resistant to weather exposure and to most acids, alkalis, oils and solvents.

Simplified Deposition

The PVC resin, of which most use is made, is Geon 121 paste. With relatively simple equipment, products similar to those made by the conventional moulding, calendering, solution or latex coating techniques are being produced with substantial economies. To deposit vinyl materials on cloth it was formerly necessary to employ a calender, the 4-bowl calenders normally used for this purpose costing about £25,000 each. Solution coating methods, also previously employed, have the disadvantage that large quantities of expensive solvents must be employed, while substantial coatings need many passes to build up the thicknesses required. These factors result in high production costs which can be greatly reduced by the use of pastes.

The particle size of Geon 121 paste resin is in the region of 1 to 1.5 microns, which is smaller than that of the normal PVC, and the particle shape is also different. Mixed in the cold, this new resin readily disperses in certain plasticisers to give pastes for spreading, moulding, casting and dipping. It is an important advantage of the paste process that it is necessary to heat the vinyl composition only once, although the heating must be sufficient to drive the plasticiser into the resin; to ensure complete fusion the mass must be heated above 175° C.

In processing other types of vinyl resins, the use of heat is necessary during at least two stages of the operation. They require to be plasticised on a hot mill or other heated equipment and then to be calendered on hot rolls or extruded through a hot die.

Using a Geon 121 organosal formulation (substantially resin plus plasticiser), films and coatings up to .004 in. thick can be made in one operation. For films and coatings between .004 in. and .02 in. thick, also made in a single pass, a plastisol type formulation (resin plus

plasticiser plus non-solvent diluent) is preferred. Pastes having an approximately 60/40 resin/plasticiser ratio are usually coated on fabric or paper, using the normal doctor knife technique. A machine designed for spreading rubber compounds is quite suitable. The deposited film can be gelled at about 180° C. by passing over a hot drum with the fabric side down.

Alternatively, thicker films can first be set on a standard type steam chest at 130° C. and are subsequently gelled completely at 180° C. by infra-red or other forms of heating before passing between cooled embossing rollers. The process can, if necessary, be carried to completion in one stage. The paste technique also offers a definite advantage over other methods in that the partially gelled material can be stored indefinitely and conveniently finished when an order is filled.

Domestic and Commercial Films

The many useful applications of paste films and coatings include thin films (.001 to .002 in.) for food packaging, coatings of medium thickness (.004 to .008 in) for vinyl "oil-skins," kitchen table coverings (vinyl American cloth), industrial protective clothing, etc., and heavy films (.015 to .02 in.) suitable for upholstery, luggage, etc., the last being by far the largest quantity used. All these may be printed or embossed as required. All products made with Geon 121 pastes have, *inter alia*, petrol, oil and solvent and abrasion resistance. In general, the use of Geon 121 resin is claimed to enable many established processes to be simplified and modernised, including methods in current use for producing manufactured goods and for discovering new ways in which pastes can be applied.

Of the 200 series of vinyl chloride-vinylidene chloride copolymer resins, the most important are Geon 202, 205 and 200X20, although the last is not commercially available.

The first step in the manufacture of these resins is the preparation of trichloroethane by reacting some of the vinyl chloride monomer with chlorine. By suitable treatment with caustic soda the trichloroethane is next converted into vinylidene chloride monomer through the loss of one molecule of hydrogen chloride. The two monomers are then polmerised in the correct proportions, giving a product in which vinyl chloride molecules are interspersed with vinylidene chloride units to form long copolymer chains.

Geon 202 is slightly more thermoplastic than Geon 101, otherwise its general properties are the same. It is therefore, used similarly to Geon 101, except as a dielectric material, but has the advantage that it can be processed at temperatures about 20° C. lower than Geon 101.

The principal use of Geon 205 is as the basis of rigid compounds for processing by extrusion, or injection or compression moulding. A most interesting use has been in the production of the new long-playing records by the Decca Record Co., an application which illustrates the extreme accuracy of moulding which is possible with rigid vinyl materials. On each side of a 12-in. long-playing record approximately one-third of a mile of sound track is precision moulded, with a precision better than .001 in.

So far, no Geon solution resin is yet being made in Britain, although the new Geon 200X20 resin is suitable for this type of processing. British Geon, Ltd., has as yet been able to import only very limited quantities of this resin from the U.S.A. from its associates—the B.F. Goodrich Chemical Co. The same is true of 400X65, a new modified vinyl resin which can be used for the same purposes as Geon 205 and Geon 200X20.

Polyvinyl materials in latex form can be employed for purposes and by techniques normally not practicable with vinyl resins in their more conventional forms. Companies already equipped to use latex techniques, when changing over to vinyls would obviously prefer to use them in latex form. Geon vinyl latices are colloidal dispersions of vinyl type polymers in water, resembling rubber latex in appearance.

Wide Resistances

Films, impregnation and coatings of these latices have all the desirable properties characteristic of vinyl materials. They will not perish or rub away, are easily sponged clean, can be coloured or printed on with no loss of properties. They resist water, acids, oils and greases, do not readily peel or crack and are not easily stained. They are highly resistant to weather exposure, salt spray, tropical conditions and fire. The properties of any absorbent material in any form can usually be improved by treatment with the correct latex.

The two main types at present produced by Geon, Ltd., are Geon 352 and Geon 652. These differ in certain important respects. Geon 352 is an unplasticised water dispersion of a modified vinyl chloride resin, the solids content of which is approximately 55 per cent. Geon 652 is a water dispersion of a vinyl type resin, the solids content of which is also approximately

the same. This latex contains no added plasticiser, the resin itself being internally plasticised by adjustment of the molecular structure during manufacture.

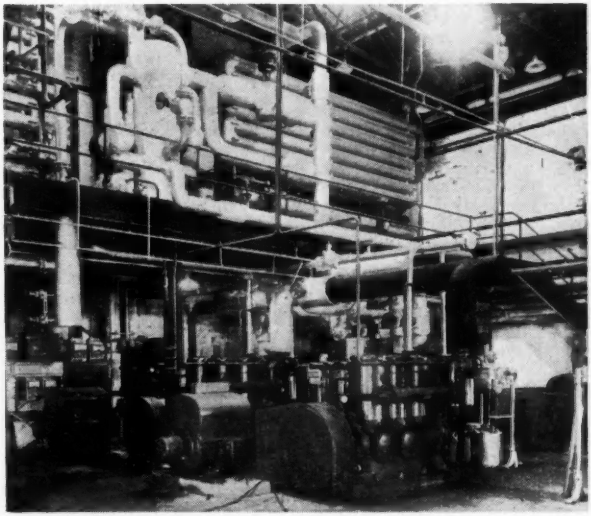
Film and coatings from the 352 latex and its plasticised forms, after drying, require heating for a short period at 130° to 150° C. to develop maximum properties. Those from Geon 652, however, give tough, flexible films on simple air drying, although the application of moderate heat in the last stages will speed up drying of the film.

While the 352 latex type films offer fair resistance to the passage of water vapour, those from Geon 652 are extremely impermeable, being about 20 times more resistant than the former. On the other hand, the stability of Geon 652 to heat and ultraviolet light is rather less than that of films made from Geon 352. The base resin of 352 is in turn less stable in these respects than a straight polyvinyl chloride resin such as Geon 101.

Geon 352 latex is a well-established material; its compounding and processing techniques and film properties having been extensively studied. Geon 652, however, is comparatively new. With its valuable property of air drying and its extremely low moisture transmission rate, it has enabled vinyls to enter many new fields. The technique of compounding and processing this latex, however, have not yet been fully explored, nor has it been possible as yet for data to have been accumulated on all the properties of Geon 652 latex films.

Whereas Geon 352 can be stored for very long periods provided that the *p*H is not allowed to fall below 7, Geon 652 is a tricky material to handle. Its *p*H has a tendency to fall during storage, a characteristic which is accelerated at elevated temperatures. Geon 652 latex, however, is able to withstand a considerable fall in *p*H (as low as 3) without harm. The resin has a tendency to settle out during storage, but the latex may be restored to its original condition by gentle stirring, if it has not been left standing too long. Additions of compounding ingredients to 652 require to be made only before ageing and use, the *p*H of the latex being first checked and, if necessary, adjusted with trisodium phosphate or a similar agent. Thus, although Geon 652 can be handled quite successfully, it is usually advisable to consider the use of Geon 352 first unless some of the special properties of 652 are really needed.

In general, Geon 352 should be used when heat can conventionally be applied to the article being treated, though heat needs to reach only as far as the latex has penetrated, and then only for a short period. If heating is either inconvenient or impracticable, or among other properties very low moisture vapour transmission rate is required, then the suitability of Geon 652 should be investigated.

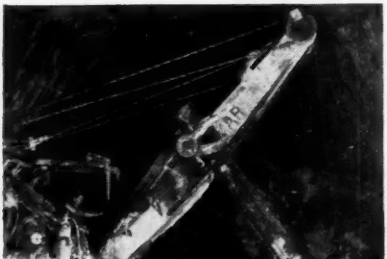


In this large refrigeration section vinyl chloride is brought to to the carefully regulated temperature required for complete polymerisation. This is one of several critical processes upon which the retention of the special qualities of the resin largely depend

[*By courtesy of British Geon, Ltd.*]

THE WORLD'S DEEPEST LIMESTONE MINE

Mining and Processing Half-a-Mile Underground



One of the powerful electric shovels in the Baberton (Ohio) limestone mine

THE importance of limestone in the manufacture of heavy chemicals has brought about a remarkable chemical engineering achievement in Ohio, U.S.A.

Ten years ago, following nearly a quarter of a century of planning, the Columbia Chemical Division of the Pittsburgh Plate Glass Co., at Baberton, began to sink shafts to the extensive limestone beds situated nearly half-a-mile below the earth's surface.

Twin shafts, 550 ft. apart, were driven into the Ohio farmland two miles north of Columbia's alkali producing plant. Drilling and mining crews, advancing an average of 6 ft. a day, blasted and drilled straight down through scores of sandstone and shale formations, to start the world's deepest limestone mine.

That mining at this depth would be expensive, was fully appreciated. Advantages, however, would be a guaranteed steady supply of limestone of high lime content, expensive freight charges would be eliminated, and the need for maintaining large reserves of the material during winter months when the Great Lakes are ice-blocked would be minimised.

More than 400 days were required to sink the vertical shafts, measuring 16 ft. by 7 ft. The walls of the shafts were framed with steel and lined with concrete, one to a depth of 2323 ft. and the second to a depth of 2258 ft.

Boring through the first 300 ft. beneath the surface, water was encountered flowing at the rate of 60 gallons a minute. This flow was collected into a sump and delivered back to the surface by automatic pumps. Oil in small quantities was met at a depth of 520 ft. Slight pockets of methane gases were found around the 2000 ft. depth, but these dissipated rapidly and proved to be of little difficulty to the mining crews.

Each shaft was operated on four six-hour shifts, the operation proceeding seven days a week. An average of 22 lb. of dynamite was utilised in blasting each foot of shaft. Approximately 100,000 lb. of the explosive were discharged in blasting operations.

For the development of "rooms" to house the underground crushing unit, transformer room, conveyor galleries, and the 550 ft. "drift" connection between the two shafts, more than 30,000 tons of rock were removed to provide working room for the crushing and conveyor equipment.

Mechanisation Problems

One of the main problems of working at such a depth was the lowering of equipment needed to operate the so-called "deep lime" operation. All heavy machinery had to be dismantled and reassembled by skilled workmen on reaching the limestone bed. Crushing equipment, capable of smashing stone weighing up to three tons, had to be lowered to the working surface and assembled. Much of the equipment had to be specially designed so that it could be lowered through the shaft compartment.

The Baberton operation was a pioneering venture in this form of mining and numerous situations, new to the mining industry, were encountered. A large proportion of the equipment was specially designed by engineers of the Columbia Chemical Division. To-day a working force comprised of miners and skilled workmen such as electricians, boilermakers, painters, riggers, are producing the limestone essential to the operation of the Division's chemical producing plant at Baberton.

The mine itself is now a series of rectangular rooms about 32 ft. wide with a ceiling of 28 ft. Mining engineers call the development method used at Baberton "a two-entry room and pillar method of development." To the layman, the mine openings appear to be long, level, rectangular tunnels blasted out of solid limestone.

At the advanced working surface holes for dynamite charges are drilled into the limestone rock with pneumatic drills mounted on labour-saving, mobile rigs. The holes are spaced so as to break limestone rock of suitable size for the crushing equipment. The actual explosion employs electric delay blasting caps. As much as one ton of explosive is used each night.

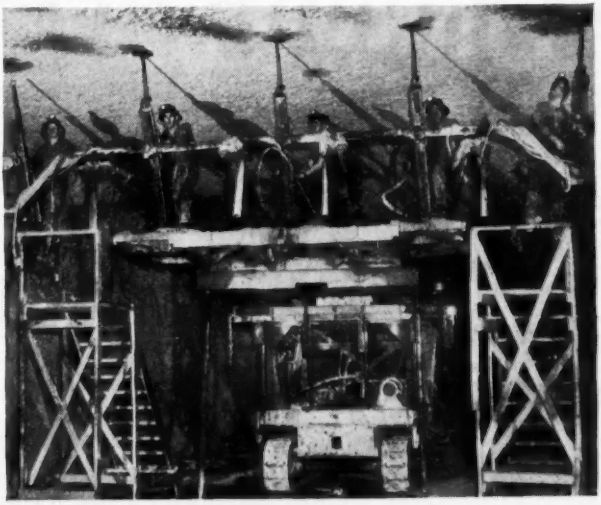
"Scalers" move in the following morning to prise loose rock from the walls and ceiling. The blasted limestone, some in sections weighing several tons, is loaded by electrically powered shovels into diesel driven dump trucks.

The primary crusher, within the mine, ensures that the largest piece is not more than 6 in. in diameter. A conveyor belt system passes the mineral to a 400 ton capacity storage bin from which it is lifted up the production shaft by automatically operated 10-ton capacity skips.

In the surface operation the stone is again passed on broad rubber conveyor belts to the screening mill. Electric lorry cars transport stone screened from 1in. upwards to the alkali plant. Of the remaining stone less than 1 in. in diameter, about half is processed into agricultural limestone and the balance goes into various sizes of commercial aggregate for asphalt for concrete manufacture, road construction and other commercial applications.

Rock temperature in the mine is 83° F. but a down draft ventilating current, giving 100,000 cu. ft. per minute, supplies ventilation and cuts the temperature to about 70°. The forced air current passes through the working areas and returns to the surface through the production shaft. The direction of air flow can be reversed.

Drinking water from the company's own filtration station on the surface flows down through a half mile of pipe to the electrically cooled water fountains. Located in the brightly lit working area near the service shaft entrance are the machine repair shop, transformer station, mess hall and other permanent installations which give the mine area the appearance of a busy factory.



Limestone drilling team working from a Jumbo platform. Holes are spaced so that the blasting operation will break the limestone into lumps of the maximum size that can be handled by the loading equipment. Very fine stone is unsuitable for use in the chemical plant of the Pittsburgh Plate Glass Co.

Northern Queensland Minerals

A syndicate in which are included some Melbourne interests, is to exploit the raw materials occurring in the Bowen coastal district of Northern Queensland, Australia. The substances include magnesite, asbestos, gypsum, lime, pyrites, ochres, various oxides and pottery clays. An initial enterprise has been the establishment of a £25,000 works to process agricultural lime, employing a £10,000 rotary kiln.

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Metallurgical Section

4 November 1950

WELDING RESEARCH

Aspects of BWRA Work at Abington

RESEARCH work in progress at Abington Hall was shown to the technical Press when they visited the engineering and resistance welding laboratories of the BWRA at Abington recently. Among several interesting investigations on view were the tests being carried out on vessels and other structures by the use of the new pulsating pressure plant (THE CHEMICAL AGE, *63*, 467). Also being shown were various types of equipment for fatigue testing.

The method used for fatigue tests is the production of vibrations close to the natural frequency of a mass spring system in which the test pieces, some of very considerable size, form the spring. Full-scale bridge members are tested by producing push-pull vibrations in a system in which two large masses of steel weighing 4 tons each are coupled by a bridge cord, the whole system being freely suspended in space and excited by a mechanical vibration exciter running at 4000 revolutions per minute. The out-of-balance force produced is in the neighbourhood of 5 tons and this is magnified 25 times by resonance in the test piece.

Fatigue Strength of Joints

Another investigation in progress is concerned with the determination of the fatigue strength of welded joints, of the type which occur in vehicle structures where the loading is applied normal to the plane of the structure and a very complex state of stress is set up at the joints. A cruciform joint between two 6 in. by 3 in. channel sections is the first type of joint investigated. It is proposed to investigate other type of joints and welded joints in light alloys.

A long-term investigation in progress is concerned with the determination of the effect of residual stresses on the fatigue strength of structural mild steel. Residual stresses are introduced in the surface of 2 in. diameter bars by rapid local induction heating to a temperature of 500° C. A small amount of plastic upset is thus produced in the surface and, on cooling, high tensile stresses develop on the surface which are balanced by compressive stresses in the core.

The stresses can be measured by cutting the bar into small sections, which is done by a special slow-speed saw, and the elastic recovery following the cutting operation is measured by a special inductance strain gauge of $\frac{1}{2}$ in. gauge length. The bars treated in this way are fatigue tested by introducing bending vibrations.

Reclaimed Shafts

The same method is used to determine the fatigue strength of shafts reclaimed by welding. Steel shafts of 4 in. diameter with a weld bead deposited in the circumferential groove are similarly vibrated and it has been found from the tests carried out so far that the alternating bending fatigue strength of such shafts is reduced by approximately 2 tons p.s.i. from $\pm$ 13.5 tons p.s.i. to $\pm$ 11.5 tons p.s.i. The laboratory is working on ways and means of increasing this figure to that possessed by the virgin material.

One of the largest specimens tested in the laboratory consisted of a heavy crane rail welded to mild steel flange plates by means of heavy intermittent fillet welds, the whole specimen weighing 1 ton. The object of this investigation was to determine whether fatigue cracks would develop at the stress range to which such joints may be subjected in service and whether, if such cracks developed, they would propagate in the rail or in the flange plates.

The effect of incidental stray flashes produced inadvertently during welding on high duty mild steel components is being investigated because it has been found that such stray flashes, when situated in zones of high fatigue stress, may reduce the life of a part. This effect is ascribed to the formation of a very hard martensitic structure due to the very small heat input. Micro hardnesses of over 1000 Vickers were found in stray flashes of this

type made in mild steel. These hardened structures are frequently associated with minute hardness cracks. While it is impossible to eliminate these cracks in any other way than by filing the flash out, a certain improvement can be obtained by heat softening a hardened structure.

Another investigation recently concluded was concerned with various welded details used in ship structures. This investigation was carried out using large specimens consisting of a piece of plate 10 ft. by 2 ft., to which rolled angle stiffeners are welded. Different types of joints in stiffeners and different methods of connecting stiffeners to plating have been investigated. The results show that when a welded joint is made in a rolled section, a simple butt weld, provided it is of good quality, is superior to any other type of joint made by using reinforcing straps. A number of different types of straps were investigated, and it was found that those at present in use in shipyards are not very strong under fatigue loading. Another type of strap is suggested for the reinforcement of butt welds which is as economical as that used at present and gives a much better fatigue strength.

The Growth of Welding Technology

THE growth of British welding from its beginnings early in this century to its present assured position as the principal means of joining metals was surveyed by Mr. C. S. Milne in his presidential address at a meeting of the Institute of Welding held in London last week.

The first arc welding company was formed in Sweden about 52 years ago, but it was not until some years later that any commercial interest in arc welding was shown in this country. Oxy-acetylene welding was first practised in 1901. Five years later it was on view at the Naval, Mercantile and General Engineering and Machinery Exhibition, and was making considerable progress. This was no doubt partly because it seemed more conventional in those days to melt metals with a flame.

Acetylene Generator

At least four firms were showing oxy-acetylene welding at a similar exhibition at Olympia in 1910. It was in this year that M. Milne became seriously interested in welding; he was exhibiting an acetylene generator for the design of which he had been responsible.

Fusion welding seemed to be the solution to many problems, and in 1911 Mr. Milne formed his own business and other firms came into the field shortly afterwards. It was, however, no easy matter to convince people of the advantages of the new process of fusion welding.

Engineers tended to be more conservative 40 years ago than they are today and were, in the main, sceptical of these new notions, which cut right across all established practice. The engineering periodicals in their turn showed no great interest or enthusiasm about these new methods. Dissemination of knowledge of what could be done and of the best ways of doing it was consequently meagre, and those who saw a future in fusion welding had to feel their way individually.

The first marked progress in welding and the new methods came in the 1914-1918 war, when it was found that the mass production of such war materials as floats for submarine nets and mine cases could be far more rapidly, and sometimes more cheaply carried out by welding with semi-skilled labour than similar riveted equipment could be manufactured.

In 1923 the Institution of Welding Engineers was formed to represent the interests of all systems of welding. This widened the sphere of interest and gave a platform for the rapidly developing technology. Those entering the welding field from that time onwards had opportunities to put forward their views and discuss their welding problems with their fellows at the numerous meetings held by the institution.

The Research Association

As engineers in general became more interested in the possibilities of welding, the magnitude and importance of welded structures and equipment increased rapidly and deeper scientific study became necessary to ensure the safety of many classes of welding fabrication. At this point the Institution of Welding Engineers was reconstituted as the Institute of Welding and inaugurated a welding research council within its compass, so that welding problems could be impartially investigated. Later it became necessary to separate the research side from the institute in order to retain the very considerable financial assistance given to research by the Government. This led to the formation of the British Welding Research Association.

STEEL PLAN ABANDONED

Production Increases Defence

THE halting, or at least postponement, of general schemes to increase production in iron and steel undertakings because of impending nationalisation is further illustrated by a decision of the Staveley Iron and Chemical Company.

The directors, in view of the fact that their company is cited in the schedule of the Iron and Steel Act, have decided not to proceed with the comprehensive scheme to extend the blast furnaces and the by-product plant.

This decision was reported by Mr. David N. Turner, chairman of the Staveley Coal and Iron Co., Ltd., at that company's annual meeting last week.

The consolidated profits of the Staveley Coal and Iron Co., for the year ended June 30, were £1,359,936 compared with £1,303,061 the previous year. In his speech, Mr. David N. Turner said that the accounts showed that over 60 per cent of the profits of the group last year was derived from the Iron and Chemical Company. Nearly 70 per cent of the capital and reserves of the group was represented by the assets of that company.

The output of pig iron had again been a record in spite of the fact that one furnace was out of blast for relining for nine weeks. The coke oven and chemical departments had worked well.

At the British Soda Company the new evaporator plant was started up in March and was not yet in full production owing to various engineering difficulties which had not yet been fully corrected.

The only subsidiary company results of which had not come up to expectations was Birmingham Chemical Co., Ltd. A reorganisation was being carried out there.

Steel Expansion Suspended

Reorganisation of the smaller mills at its Monway Steel Works which had been almost completed, is to be suspended by The Patent Shaft and Axletree Co., Wednesbury, in view of the impending nationalisation of the steel industry.

Morocco Cobalt for U.S.A.

The Economic Co-operation Administration has announced that, by a new arrangement with the French Government, America will obtain some 7200 tons of critically-needed cobalt ore from French Morocco. Cobalt is used in special alloys such as permanent-magnet, high-temperature and high-speed steels.

C

MORE METAL CUTS

U.S. Conservation of Cobalt

CIVILIAN consumption in the U.S.A. of three basic materials widely used in consumer goods, copper, aluminium and nickel, is scheduled to be reduced by 20 to 30 per cent, the National Production Authority has announced. The use of a fourth metal, cobalt, important in the production of electrical appliances, radio and televison sets, may be reserved for military and defence needs.

In announcing the plans to cut the use of these metals NPA Administrator W. H. Harrison said that regulations making the cuts effective would probably be issued in several weeks; it is unofficially expected that the cuts will become effective on December 1. The regulation will not restrict the allocation of whatever is available among the many user industries.

Steel Industry Trend

THE future trend of developments in the steel industry in Scotland was oulined by Mr. W. Barr, director and chief metallurgist, Colvilles, Ltd., when he spoke at the West of Scotland Iron and Steel Institute. He anticipated a trend towards four-high mills to meet the growing demand for wider thin plates for welded ship construction. Another major problem lay in the power industry where demand for border shell plates of up to 5 in. in thickness was becoming fairly common. The manufacture of such plates, to withstand increased stresses, was fraught with difficulties. Low alloy high-tensile weldable steel was the subject of continuing research for high-pressure vessel manufacture.

African Nickel, Copper and Cobalt

DEVELOPMENT work was now in progress in the Mount Ayliff area of Pondoland, South Africa, where, from the assay results of boreholes made by eminent geologists, there appeared to be extremely promising deposits of nickel, copper and cobalt. This was stated by Mr. J. H. Wormell at the annual general meeting of the Aurochs Investment Co., Ltd., in London, last week. The increased prices of these base metals should be very helpful to their company. Copper, which during the war was £57 a ton, was now £202 per ton; nickel during the last three months had increased in price from £321 to £386 per ton; and cobalt, which was becoming greater in demand, was now £1120 per ton.

THE SEPARATION OF URANIUM

Mineral Technique Developed by the CRL

IN recognition of the heightened need for analyses of uranium-bearing minerals the Chemical Research Laboratory (Department of Scientific and Industrial Research) issued last week a handbook* giving practical recommendations for the separation and determination of the element. Working details of the separations are given, as well as the quantitative methods to be employed.

Among the general principles discussed is the method of obtaining a solution of the ore for analysis. This depends upon how readily the ore can be decomposed.

Treatment of Ores

Pitchblende ores decompose readily in mild treatment with nitric acid, whereas refractory ores such as the uranium-bearing niobates, tantalates and titanates require more drastic treatment, such as fusion with alkali hydroxide or carbonate.

Even with the more soluble ores, a small amount of insoluble material usually remains unattacked in acid. Further treatment of this insoluble fraction with hydrofluoric acid, or fusion with alkali, is therefore necessary. The entire sample should be brought into solution to avoid loss of uranium in any discarded fraction.

Pitchblende, uraninite, torbernite and autunite are examples of ores which are usually almost completely soluble in dilute nitric acid or in a mixture of nitric and hydrofluoric acids. The more refractory ores which usually require fusion with alkali or potassium bisulphate include euxenite, samarskite, monazite, thorite.

It frequently happens that the ore submitted for analysis contains only a relatively small amount of uranium, together with a large amount of siliceous matter. Such ores may often be decomposed by treatment with nitric acid in the presence of hydrofluoric acid.

The procedure employed for the initial breakdown and solution of a mineral product may influence the choice of method adopted for subsequent separation and purification of uranium in solution. For example, in the ether-liquid extraction procedure for the separation of uranium from the sample solution, sulphate ions must be absent; if the decomposition of the ore involved the use of sulphuric acid or potassium bisulphate it is therefore necessary to introduce an intermediate stage for the separation of the sulphate ion.

Fusion with excess of potassium hydroxide at a high temperature for one hour will decompose any mineral product likely to be submitted for examination. This, therefore, is a general method for ore breakdown. It is not necessary, of course, when simple acid treatments are sufficient.

Other reagents used for decomposition of ores are sodium peroxide, potassium hydrogen fluoride, sodium or potassium bisulphates (pyrosulphates), and sodium and/or potassium carbonates.

One of the methods used for the separation of metallic or other ions present in solution with uranium, following the decomposition and solution of the ore sample, is the standard chemical method.

Chemical Method of Separation

This gives good results and is particularly suitable for high grade uranium products, but it takes rather a long time. The following chemical processes are involved:

(1) The solution of the ore, which should contain sulphuric acid, is evaporated until fumes of sulphur trioxide are evolved.

(2) The mixture is cooled and a mixture of hydrobromic acid and bromine is added, the solution being again boiled to fumes of sulphur trioxide; a number of metals forming volatile bromides (As, Sn, Se, etc.) are then largely removed.

(3) The mixture is diluted and treated with hydrogen sulphide under slight pressure for some hours; the sulphides of a number of metals (Pb, Hg, Cu, Cd, As, Sb, Sn, Mo, Pt) are then formed and separated.

(4) The solution from sulphide precipitation is fully oxidised by boiling to fumes of sulphur trioxide with addition of perchloric acid, potassium permanganate or persulphate solution.

(5) The solution is cooled and treated with cupferron (ammonium nitrosophenyl hydroxylamine); the complex salts of ferric iron, titanium, vanadium and zirconium are then formed and extracted by shaking with chloroform.

The solution is now free from all metals which interfere with the final volumetric determination of uranium. A colorimetric finish cannot be readily employed with

* Handbook of Chemical Methods for the determination of Uranium in Minerals and Ores (1s.)

this method, since certain metals (rare earths, Mn, Th, etc.), are not entirely removed; they do not, however, interfere with the volumetric method. If cobalt and nickel are present in appreciable quantities, electrolysis with a mercury cathode is included before the volumetric determination. The fact that the separation procedure does not yield a pure uranium solution limits the scope of this standard procedure considerably.

The liquid-liquid solvent extraction method is based on the quantitative extraction of uranium as uranyl nitrate by ether, from aqueous solutions containing metal nitrates and free nitric acid. The method gives satisfactory results with practically all types of ores over a wide range of uranium concentration. It is recommended for general use as being reasonably rapid, clean and accurate.

The process includes the following stages:—

(1) The solution of the ore in nitric acid medium, free from sulphate and halogen ions, is mixed with a saturated solution of a mixture of ferric, calcium and ammonium nitrates which improve the partition coefficient of the metal nitrate in the organic solvent.

(2) The aqueous mixture is then extracted with ether. This may be done by hand shaking in separating funnels or in a continuous solvent extractor.

(3) The ether solution, which contains the whole of the uranium and small quantities of other metal ions, such as ferric iron and vanadium, is diluted with water and the solvent removed.

(4) Traces of organic matter are destroyed by evaporating with sulphuric acid and perchloric acid.

(5) The solution is diluted with water and the small amounts of ferric iron, vanadium and other impurities removed by treatment with cupferron and chloroform. After removal of organic material by evaporating with perchloric acid, the solution, which contains practically pure uranium, is ready for final determination by volumetric, colorimetric or polarographic procedures.

Ether Extraction Method

The method of extraction with ether cannot be used when large amounts of sulphate ions are present. Thus, if sulphuric acid or potassium bisulphate is used for the decomposition of the ore it is necessary to make an intermediate precipitation of the uranium as hydroxide. The presence of phosphate ions in the sample inhibits extraction of uranium by ether, but this effect is overcome by increasing the amount of ferric nitrate added to the solution before extraction, the addition of calcium nitrate then being omitted to avoid separation of any insoluble calcium phosphate.

A Rapid Process

A useful and rapid method developed at the Chemical Research Laboratory for the separation of uranium from a large number of other elements is that of solvent extraction in combination with a cellulose adsorbent. The method is based on the observation that uranyl nitrate in ether containing nitric acid (5 per cent) is not adsorbed by cellulose but passes through a column packed with this material whereas the majority of other elements are strongly adsorbed or move down the column only slowly. In this way an ethereal eluent containing substantially pure uranium is obtained in quantitative yield and the element can be determined by a suitable procedure without further separation. The method used is as follows:—

(1) The sample in concentrated solution containing 25 per cent nitric acid, is soaked up in a portion of cellulose pulp.

(2) This is then transferred to the top of a column of cellulose previously prepared by agitating cellulose pulp with ether containing 5 per cent nitric acid, the pulp being allowed to settle in a glass tube so as to form a smooth continuous column.

(3) Ether containing 5 per cent nitric acid is passed through the column to extract the uranium.

(4) The ether eluent is diluted with water, the solvent evaporated and the uranium determined by volumetric, gravimetric, colorimetric or polarographic procedures. The method is suitable for routine use at any concentration of uranium in minerals and ores.

A micro method using solvent extraction in combination with absorbent paper strips is useful either as a qualitative test or for a quantitative determination of very small amounts of uranium. The procedure is as follows:—

A measured volume of the solution to be tested, in nitric acid solution, is placed near the top of a strip or sheet of absorbent paper, such as Whatman No. 1 filter paper. The test spot is allowed to dry in air and the top end of the paper is immersed in an organic solvent, such as ethyl acetate or tetrahydrosylvane, containing a small amount of nitric acid. The strip is arranged to hang vertically in a suitable vessel such as a gas collecting jar; the solvent then diffuses downwards through the paper and over the test spot.

(*continued at foot of next page*)

Diminishing Non-Ferrous Metal Stocks

A GENERAL decrease in stocks of non-ferrous metals in the United Kingdom in September is revealed in the data supplied by the British Bureau of Non-Ferrous Metal Statistics.

Closing stocks at the end of the period compared with September, 1949, were: blister copper 41,626 tons (53,663); refined copper 78,762 (91,573); tin 8196 (15,872); zinc concentrates 43,071 (36,239); slab zinc 48,414 (73,862).

Production showed an improvement in most categories. Primary refined copper, for example, totalled 14,381 tons (11,691) and English refined lead 6550 (2435).

Exports of tin were greatly increased—1118 tons compared with 553 tons in September last year.

UNWROUGHT COPPER

	Long Tons	
	Blister Copper	Refined Copper
OPENING STOCKS:		
Govt. and consumers'	47,338	78,810
Imports	7,354	19,108
PRODUCTION:		
Primary	—	14,381
Secondary	1,712*	7,072
CONSUMPTION:		
Primary	14,531	31,712
Secondary	—	14,426
Exports	2,377†	27
CLOSING STOCKS:		
Govt. and consumers'	41,626	79,762

* Rough copper.

† Includes 1126 tons of rough copper despatched to Belgium and 1251 tons of rough copper to Germany for refining on toll.

GROSS OUTPUT OF MAIN COPPER, ALLOY AND PRODUCTS

Unalloyed copper products	27,331 long tons
Alloyed copper products	26,686 ,, ,,
Copper sulphate	4,910 ,, ,,

CADMIUM

	Long Tons
TOTAL CONSUMPTION OF CADMIUM	48.2

THE SEPARATION OF URANIUM

(*continued from previous page*)

Uranyl nitrate in the sample is dissolved by the organic solvent and moves down the paper with the solvent front as diffusion proceeds, whereas other metals either remain stationary or move only slightly in comparison with the uranium. After the solvent has moved a few inches past the test patch, the strip is removed and the solvent allowed to evaporate.

For quantitative determination, the portion of the paper strip containing the uranium is cut out, this section of paper being ashed and dissolved in acid. Uranium is then determined in the acid solution by the polarograph.

ANTIMONY

	Long Tons
TOTAL CONSUMPTION OF ANTIMONY METAL AND COMPOUNDS	529
TOTAL CONSUMPTION OF ANTIMONY IN SCRAP	341

UNWROUGHT ZINC

	Long Tons	
	Zinc in Concentrates (estimated gross Zinc content)	Slab Zinc (all grades)
OPENING STOCKS:		
Govt. and consumers'	44,731	54,662
Imports	6,501	11,014
PRODUCTION:		
Virgin and remelted	5	6,578
CONSUMPTION:		
Virgin (incl. debased)	8.166	23,334
Remelted and scrap	—	7,650*
Exports and re-export	—	3
CLOSING STOCKS:		
Govt. and consumers'	43,071	48,414

* Includes a small quantity of zinc concentrates consumed directly for chemicals, etc., which is also included as consumption of concentrates.

LEAD

	Long Tons			
	Lead in Concentrates	Imported Virgin Lead	English Refined	Lead Content of secondary Scrap and Residues
OPENING STOCKS:				
Govt. and consumers'	—	75,189	6,118	—
Other stocks ...	55	—	—	—
IMPORTS	—	4,874	—	69
PRODUCTION	262	—	6,550	—
CONSUMPTION ...	262	15,637	5,564	7,802
EXPORTS	—	25	—	—
CLOSING STOCKS:				
Govt. and consumers'	—	64.105	7,104	—
Other stocks ...	55	—	—	—

TIN METAL

	Long Tons
GOVT. AND CONSUMERS' STOCKS (at end of period)	8,196
IMPORTS	500
PRODUCTION	—
CONSUMPTION	1,841
EXPORTS AND RE-EXPORTS	1,118*

* Exports total 1118 tons, of which to U.S.A., 204; Germany, 201; S. America, 136; Egypt, 111; Syria (Lebanon), 71; Sweden, 52; France, 50; Hungary, 50.

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Technical Publications

CHANGES to the "Model Safety Rules for Use in Chemical Works, Part I," made necessary by the Factories Act, 1948, and a few minor alterations suggested by experience, have now been listed by the Association of British Chemical Manufacturers. The amendments are issued in the convenient form of gummed slips for insertion in the blank pages provided in the existing rules. Copies of this first supplement are being sent to all known purchasers of the original edition of Part I.

* * *

CHEMICAL and welding operations sometimes involve the production of fumes in close proximity to the worker, who may be obliged to inhale some of them while they are hot and relatively concentrated. A new appliance, the Pyrobit (Acru Electric Tool Manufacturing Co., Ltd., Manchester), is a combined ventilation and work-illuminating device comprising an air duct and an electric lamp which provides light and the heat required to create a chimney effect capable of withdrawing fumes from the work and dispersing them in diluted form above the level of the worker's head.

* * *

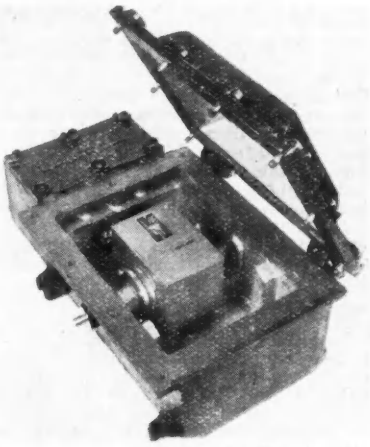
A BOOKLET of more than 100 pages on the uses of 50-odd different alloys and metals in the manufacture of steel and certain non-ferrous metals has been issued by the Electro Metallurgical Division of the Union Carbide and Carbon Corporation, New York. Interesting historical facts concerning the discovery and development of the principal alloying elements—chromium, manganese, silicon, calcium, vanadium, tungsten, zirconium, columbium, boron, and titanium—are included, with a brief description of their properties and uses. A separate catalogue deals with stainless steels and their uses and gives much technical data.

* * *

RECENT technical literature on the various applications of zinc and its products are summarised each month in "ZDA Abstracts," issued by the Zinc Development Association. The abstracts are classified under headings: die casting, finishing, coating, galvanising, chemistry of zinc, etc. The most recent issue is Vol. 8, No. 9, abstracts 774-865.

* * *

REDUCTION of wear and tear on conveyor belts is of considerable importance in order to reduce costs. A useful handbook on the "Maintenance and Preservation of Belting" has just been issued by Richard Sutcliffe, Ltd., Wakefield, manufacturers of mechanical handling equipment.



[By courtesy of Londex, Ltd.

A new pressure switch adapted for use in semi-automatic systems depending upon a continuous flow or level in situations where there may be inflammable vapour. The switch is in a flame-proof enclosure with overall dimensions of 17 *in. by* 10½ *in. by* 6¾ *in.*

* * *

BASIC information about voltages and electrical plant in any district or country is given in the "Annual Tables of Electricity Undertakings of the World," (price 30s.), just published by *The Electrician*, 154 Fleet Street, London, E.C.4. The volume contains much useful data in non-technical terms and, as a new feature, a "Who's Who" of members of the British Electricity Authority.

* * *

INSIGHT into the needs and interests of the commercial community of South Australia is afforded by the reorganised and improved "Trade Digest" issued by the Adelaide Chamber of Commerce, of which the current issue reflects the heightened interest in the technology of plastics moulding materials.

OVERSEAS CHEMISTRY AND INDUSTRY

GERMAN RESEARCH & PRODUCTION

"Prestige and National Importance Nearly Regained"

THE renewed recognition of the importance of German industrial chemistry was evident in the support given to the last annual general meeting, in Frankfurt, of the German Society of Chemical Industry (Ges. Deutscher Chemiker) and in some of the developments then revealed.

A report in *Angewandte Chemie* (*62* (19), 443-468, October 7) states that over 3000 chemists, including many from abroad, attended the proceedings.

Need for Unity

In his opening address, Dr. K. Ziegler noted that the society had at length nearly regained its former prestige and national importance, quite in the old tradition, but its rehabilitation could not be completed while the country was divided into two parts. Meanwhile its efforts in the immediate future towards the further restoration and advancement of German chemical industry must be applied more particularly to the rebuilding and staffing of the various schools and chemical institutes, with special reference to those in the province of Hesse, which included those at Frankfurt/a/M., Darmstadt, Giessen and Marburg.

The importance of Hesse as a centre of chemical research and industry was further emphasised by Dr. J. Newman, representing the high commission of that province. He said that, out of a total export value of Dm. 237.4 million from Hesse in 1949, Dm. 20 million was represented by chemical products. These figures appeared likely to be greatly exceeded in 1950, for in May alone chemical exports were valued at Dm. 25 million out of an export total of Dm. 105 million.

Dr. B. Rajewsky, rector of the Johann Wolfgang Goethe University, Frankfurt a/M., reporting on the work of restoration there, said the large new hall of the chemical institute was now ready for occupation.

The society's Emil-Fischer medal for the year was awarded to Dr. H. Meerwein, of Marburg (Hesse), for noteworthy research in molecular interchange and the mechanism of chemical reaction, leading to a comprehensive theory of homogeneous catalysis. The Justus-Liebig medal was given to Dr. Erich Konrad, of Leverkusan, for fundamental scientific research in synthetic rubber and its applications, including the development of Buna.

As a memorial to the work of Dr. Alfred Stock in the sphere of chemical education, a foundation was established by friends, scholars and the GDCh, to be administered by trustees. A gold medal and prize of Dm. 1000 was agreed to be given each year for the best work in inorganic chemistry under specified conditions, as adjudicated by the GDCh and beginning with this year, when the prize-winner was Dr. Egon Wiberg, of Munich, for his research in boron compounds and hydrides. Dr. H. O'Daniel, dean of the science faculty, Frankfurt University, addressed laudatory remarks to a French colleague, Jean Roche, who, he said, was one of the most famous biochemists and a friend of German chemical research.

Membership of the society was reported to have increased satisfactorily to the present figure of 5200—about 1000 more than 1949. Local sections had grown and now numbered about 30. More than 350 scientific papers had been read to them during the past year. The technical groups also had extended their activities and now included a new group concerned with patents and trade marks law.

Dr. Paul Karrer, well known author of the widely used organic chemistry textbook, who represented Switzerland, greeted the assembly on behalf of the foreign visitors and of the Swiss Chemical Society. He emphasised the importance of reviving and fostering international relations in the chemical world and mentioned the interchange of students taking place between Germany and Switzerland.

The numerous papers covered a wide range of subjects, particularly in the fields of organic and biochemistry, and dealt with water, plastics, rubber, food, textile chemistry, and patents laws.

Greek Glass Industry Development

The Sté de Produits Chimiques et d'Engrais of A'hens, is to enlarge its glass plant with the help of Marshall Aid. Automatic machines will be installed which are expected to reduce costs and nearly double the production. Output has so far been only sufficient for domestic requirements.

COMMERCIAL CORTISONE

Rising Production in U.S.A.

THE possibility that the U.S. drug industry will eventually produce large quantities of cortisone was predicted at a meeting of State and territorial health authorities in Washington, D.C., by Dr. Erich Mosettig, of the National Institute of Health. He said that a great deal of progress had been made in synthesising Compound E (at present made only from ox bile) from yams, smilax, soya beans and the African flower strophanthus. The price of cortisone had dropped sharply in recent months from $250 a gram to $32. It now costs only one-tenth of last year's price.

The supply of cortisone is, in fact, so well established that Merck Company, Rahway, New Jersey, states it has a sufficient quantity of the drug on hand to enable sales to be made "over the counter" with a doctor's prescription.

It is still considered one of the most promising drugs developed for the treatment of a number of diseases, including rheumatic heart ailments. According to Dr. Luther Terry, chief of the Experimental Therapeutics Section of the National Institute of Health, there are in the U.S.A. at least 800,000 in the latter group.

Two More Antibiotics

ADDRESSING a meeting of the American Institute of Chemical Engineers in New York, Mr. John E. McKeen, president of Charles Pfizer and Co., Inc., has announced the production of two new antibiotics that may have industrial as well as therapeutic uses. They have been named Thiolutin and Netropsin. Preliminary tests on Thiolutin indicate that it may be effective in combating fungi, and Netropsin is said to show great promise as an insecticide, particularly against clothes moths and carpet beetles.

The new antibiotics bring to four the number of such materials developed by the Pfizer company in the past year. A few months ago the company announced the development of Terramycin and Viomycin. The latter is now being clinically tested as a specific against tuberculosis.

Iranian Drug Imports

The Government of Iran has abolished customs duties on a number of drugs and preparations, including quinine, stabrine, paludrine and others used against malaria; all the antibiotics; bismuth and arsenical compounds used against venereal diseases; and insecticides.

RECORD SULPHUR TOTAL

Mounting Yields in the U.S.A.

THE American domestic sulphur industry may attain the highest production ever recorded in 1950. During August, the Bureau of Mines reports, the domestic sulphur industry produced 436,612 long tons of native sulphur, which, although 29,451 tons less than July's total, was 39,588 tons more than was produced in August last year. Total production for the first eight months of 1950 was 3,446,118 long tons, well above the corresponding period in any previous year. In January-August, 1949, production totalled 3,169,308 tons. Deliveries from the mines in the eight-month period in 1950 were 3,574,412 tons as compared with 3,175,163 tons in the same period of 1949.

Brazil to Use Pyrites Source

Brazil, which has no natural sulphur deposits, and which is almost entirely dependent on foreign sources to supply her sulphur needs, is expected soon to be able to produce about 50,000 tons of sulphur yearly from pyrites from coal. This would be sufficient to fill the country's domestic needs. This estimate is based on the 40-45 per cent content of pyrites in Brazilian coal, of which about two million tons are mined annually.

Hungarian Anti-TB Drug

THE Hungarian pharmaceutical industry claims to have successfully synthesised p-acetyl aminobenzaldehyde thiocemicarbazone, a well-known anti-tuberculotic agent. The new drug, produced under the trade name of Thiomicid, is said to be highly effective. Thiomicid is the third anti-TB drug produced in Hungary since the war.

The first results in the use of Thiomicid proved very promising, states the Hungarian News and Information Service. A large amount of information concerning its effectiveness has since been collected. Clinical experiments are stated in Hungary to have demonstrated that a dilute solution of Thiomicid—1 : 500,000—has a bacteriostatic effect more marked than that of streptomycin. It is claimed that after the administration of 100 mg. of Thiomicid no Koch bacilli could be found in the spleen.

Current clinical practice of Thiomicid treatment has been extended to tracheal and bronchial-TB, tubercular infection of the kidneys, bones and joints, skin TB, and fistulas of the lymphatic glands. It can be administered for several months generally without adverse side-effects.

OVERSEAS

U.S. Titanium in 1949

The record total of 4.2 million lb. of titanium was used in steel making by U.S. mills in 1949, according to the American Iron and Steel Institute.

Fertiliser Values

The Minister for Agriculture in the Republic of Ireland has made an Order providing that a tolerance of 1 per cent may be permitted in statements covering the analysis of artificial fertilisers.

Cement Plant for Brazil

A Bill now before the Brazilian Congress proposes that exemption from duty be granted for imports of cement-mill equipment with the object of encouraging the domestic production of cement, of which there is a shortage in the country.

Italian Expansion

The Montecatini Company has announced an increase of 20 per cent in the production of sulphuric acid during 1949. Superphosphate production capacity was increased to 90 per cent of pre-war production. New nitrogen fertiliser workshops were opened at Novara and will be in operation shortly, using natural Lombardy gas for fuel.

India Defers N-F Price Control

The Government of India does not at present propose to fix ceiling prices for non-ferrous metals, it has been announced in New Delhi. The Government, however, is keeping a "close watch" on the situation, and "will prescribe maximum prices if prices show a tendency to rise unduly." Indian prices have shown an upward tendency in recent weeks. The Government, however, is satisfied that the current prices are not unreasonable.

New Portable Dust Detector

Two Scandinavian engineers have produced a simple portable instrument for measuring the amount of dust in the atmosphere. Although no new principles are involved in its design, it is thought that this hand instrument may be valuable for checking the ventilating system in factories where dangerous dusts are produced. A sample of air is drawn into the field of view of a small microscope. With a "dark ground" illumination provided by a bulb run off a battery any dust particles appear as spots of light in the microscope.

Much More Methane Gas

In the first half of this year Italy's output of methane gas amounted to 202 million cu. m. as compared with 87 million cu. m. in the same period of last year.

Norwegian Hydro-electric Power

Since 1945 the amount of electricity produced annually by hydro-electric sources in Norway has increased from 10,000 million kW hours to over 16,000 million kW hours.

French Chemicals: Reduced Totals

Production figures for July show a general decline in French industrial output compared with June. Sulphuric acid is down from 98,000 tons to 95 000 tons; soda carbonate from 53,000 to 45,000 tons. No chemical or fertiliser production has, in fact, increased.

Bolivia and German Patents

The Government of Bolivia has re-established the validity of laws of 1916 and 1918 in respect of German trade marks whereby those which had been declared invalid in 1944 and 1945 may again be registered and the import of goods bearing these is again permissible.

Indian Sugar

The Government of India has fixed prices of sugarcane and sugar at the same level as last year—Rs. 1-10-0 and Rs. 28-8-0 a maund respectively. To meet the requirements until the end of December it is necessary to produce about 100,000 tons of sugar in India before December 15.

Australian Nitrate Subsidy Urged

The Federal Department of Agriculture has recommended to the Australian Government that a subsidy of £A4 per ton be granted for the import of sodium nitrate to bring it into line with the subsidy for sulphate of ammonia. Last year Australia imported about 144,000 cwt. of sodium nitrate, mostly from Chile, at a cost of £A10,000.

Swiss Chemical Exports Revival

Official Swiss export trade returns show that shipments of chemical and pharmaceutical products and of dyestuffs amounted to (million Swiss francs) 52.7 in September, as compared with 48.7 in August. Noteworthy is the further rise in the value of dyestuff exports to 20.7 (18.4), which is only 0.1 below that of pharmaceutical products.

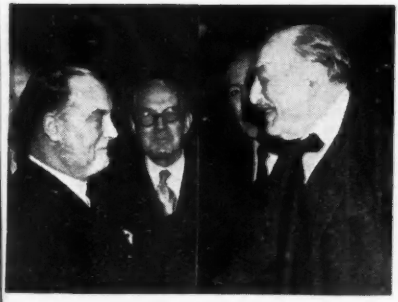
· PERSONAL ·

MR. G. M. MICHIE has joined the research and development division of the British Steel Founders' Association in a senior executive capacity. For the past two years he has been senior research metallurgist in charge of the research laboratories at Penistone of David Brown & Sons (Huddersfield), Ltd., and is known for his work on the development and application of non-destructive testing of steel castings.

SIR LEWIS FERMOR has been elected president of the Institute of Mining and Metallurgy for the 1951-52 session. He served with the Geological Survey of India from 1902 until his retirement as director in 1935, and has since been engaged as a consultant in India, Malaya and other far Eastern countries.

MR. R. E. POWELL and MR. J. A. DULLES have been appointed senior vice-presidents of Aluminium, Ltd. Mr. Powell is a director of the company and president of its principal subsidiary, the Aluminium Company of Canada, Ltd. Mr. Dulles is a member of the board and secretary of Aluminium, Ltd.

One of American chemical industry's principal honours, the Chemical Industry Medal for conspicuous service to Applied Chemistry, was awarded to MR. WILLIAM M. RAND, president of the Monsanto Chemical Company, St. Louis, by the American Section of the Society of Chemical Industry in New York City on November 3.



Sir Herbert Merrett (left) being congratulated by Lord Brassey on his election to the chairmanship of Powell Duffryn, Ltd., in succession to Mr. Edmund L. Hann

Mr. C. G. Hayman, the newly appointed chairman of the ABCM, is a director and a member of the management committee of the Distillers Co., Ltd., the board of which he joined in 1936

MR. R. L. TAYLOR (Johnsons of Hendon, Ltd.) was elected a Trustee at the annual meeting in Buxton of the Association of British Pharmaceutical Industry. Mr. Taylor was first elected to council in 1937, was president of the Association 1949-50.

The winners of the Nobel Prize for medicine are announced as DR. E. C. KENDALL and DR. P. S. HENCH, both of the Mayo Clinic, Rochester, Minn., U.S.A., and DR. T. REICHSTEIN, of the University of Basle, Switzerland. Dr. Reichstein discovered the drug cortisone, while Dr. Kendall and Dr. Hench succeeded in finding its practical clinical uses.

SIR JOHN COCKCROFT, director of the Atomic Energy Research Establishment, Harwell, is among those on whom honorary degrees will be conferred at the University of London Foundation Day celebrations to-day (November 4).

Members of the Textile Institute, Manchester, were addressed yesterday by DR. H. F. SCHIEFER, one of its distinguished American members, on the subject of textile research and testing at the U.S. National Bureau of Standards, at which he is a physicist.

Industrial Welfare Appointments

The Institute of Welfare has decided to circulate among experienced welfare officers who have notified their need of a post, details of suitable vacancies sent to the institute by employers.

HOME

Tin Touches £980

Starting firm on October 25, tin prices on the London Metal Exchange made substantial gains to new record prices. On October 31 in the closing session the cash quotation rose by £33 10s. to £979-£980 and that for three months was £25 10s. up at £941-£944.

£1 m. Groundnuts Deficit

Between October, 1949, and early April this year the East African groundnuts plantations provided in the U.K. 753 tons of nuts and 451 tons of sunflower seed. In the year ended March, 1950, the Overseas Food Corporation made an agricultural trading loss of £1,268,254, according to the official report on the second year's work, issued on Tuesday.

International Textile Research

The Textile Institute has accepted an invitation, extended by the Institut Textile de France, to be represented at the 1951 International Congress of Scientific Research Applied to the Textile Industry, to be held at Lille on May 8 and 9, 1951. Dr. D. Traill, a member of the institute's council, will deliver a paper at the congress.

Licences Unnecessary

Freer import facilities for a large group of chemical materials and metals became effective on November 1, resulting from certain alterations made by the Board of Trade in the list of goods which may be imported without individual licences from the countries collaborating to liberalise international trade. Among items freed are chromium, powdered iron, anhydrous carnallite, iron carbonate and perchloride; the following five resins: acrylic, melamine, phenol, cresol and urea-formaldehyde; certain plastics moulding powders.

Chemical Wagons Damaged

A fire in the wagon repair works at Winsford, Cheshire, of I.C.I., Ltd., last week badly damaged 20 railway wagons.

Welding Trends

A demonstration of the latest developments in welding industry research will be opened by the British Welding Research Association at the Engineering Centre, Glasgow, on Monday next.

Revised Prices for Paraffin Wax

A number of revised prices for paraffin wax and scale have been announced by Shell-Mex and B.P., Ltd. Typical prices for one ton lots and upwards are £67 17s. 6d. for grades 100-105° F., 106-110° F. and 110-115° F., and £104 10s. for grade 145-150° F.

Higher Priced Glycerin

An advance in the price of chemically pure glycerin in the U.K. and Eire, as from November 1, is announced by Glycerine, Ltd., which states that the increase has been occasioned by the continued rise in world quotations. Prices now range from 262s. to 225s. per cwt., according to quantity. The previous basic figure, fixed on August 1, was £165 10s.

Coal Production

Output of deep-mined coal fell last week by 28,700 tons. Comparative figures are: Last week: 4,375,600 tons (deep-mined 4,177,700 tons, opencast 257,900 tons). Previous week: 4,389,200 tons (deep-mined 4,146,400 tons, opencast 242,800 tons). Deep-mined coal output for the first nine months of this year was 151,021,800 tons, which compared with 149,195,500 tons during the same period last year. The average weekly output for September was 3,990,500 tons.

Obituary

THE death is announced, at the age of 61, of MR. EDWARD ERIC BILLINGTON, managing director of Edward Billington & Son, Ltd., who was three times president of the Liverpool Seed, Oil Cake and General Produce Association, and during the war years was deputy chairman of the Animal Feeding Stuffs C.i.f. Buyers' Association of Liverpool, Ltd., and a member of the Advisory Committee for the Control of Molasses and Industrial Alcohol.

The death was reported last week of SIR EDWARD JAMES GEORGE, a former president of the British Iron and Steel Federation. Sir Edward, who was 84, retired from the deputy chairmanship of the Consett Iron Company in 1940, a year after receiving his knighthood for services to the industry.

MR. JOHN CHARLES GARLAND, technical director of Streamline Filters, Ltd., has died as the result of an aeroplane accident.

Next Week's Events

MONDAY, NOVEMBER 6

Society of Chemical Industry

London: Burlington House, Piccadilly, W.1, 6.30 p.m. (Joint meeting London Section and Food and Agricultural Groups). R. Barrington Brock: "Scientific Aspects of Wine Production."

Oil and Colour Chemists' Association

Hull: Royal Station Hotel, 7 p.m. (With Hull Chemical and Engineering Society). A. R. Old and W. E. Ballard: "Metal Spraying."

Institution of Plant Engineers

London: Royal Society of Arts, John Adam Street, Adelphi, W.C.2, 7 p.m. Dr. A. C. Dunningham: "Thermal Efficiency of Combined Heat and Power."

TUESDAY, NOVEMBER 7

Royal Institute of Chemistry

Bolton: Municipal Technical College, Manchester Road, 7 p.m. E. Isaacs: "Industrial Developments in the Polymer Field over the Last Twenty Years."

Society of Chemical Industry

London: Burlington House, Piccadilly, W.1, 5.30 p.m. (Agricultural Group, Crop Protection Panel). Dr. G. S. Hartley: "Physico-Chemical Problems in the Use of Insecticides."

Society of Dyers and Colourists

Manchester: Reynolds Hall, College of Technology, 6.30 p.m. (Junior Branch). H. B. Bradley (I.C.I., Ltd.): "The Development of a New Dyestuff."

Electrodepositors' Technical Society

Birmingham: James Watt Memorial Institute, Great Charles Street. Dr. H. Saenger: "Storage and Handling of Acids."

WEDNESDAY, NOVEMBER 8

Society of Chemical Industry

London: Burlington House, Piccadilly, W.1, 6.30 p.m. (Food Group). "The Significance of Aqueous Vapour Pressure in the Food Industry." F. R. Jones: "An Accurate Method for the Determination of Aqueous Vapour Pressure"; R. W. Money: "The Equilibrium Humidity of Concentrated Sugar Syrups and other Sugar Products"; Dr. J. B. M. Coppock and Mrs. D. E. Cookson: "The Effect of Humidity on Mould Growth on Constructional Materials."

Royal Institute of Chemistry

Aberdeen: Marischal College, 5.30 p.m. (Aberdeen and North of Scotland Section, with the Chemical Society and SCI). Prof. J. W. Cook: "Some Aspects of the Chemistry of Polycyclic Aromatic Hydrocarbons."

Dublin: Trinity College, 7.45 p.m. Mamie Olliver: "A Chemist in the Food Industry."

London: County School, Ridgeway Road, Isleworth, 7 p.m. Dr. J. G. A. Griffiths: "Rockets and Chemistry" (with films).

Manchester: University, 6.30 p.m. (Manchester and District Section, jointly with the Chemical Society and the SCI). Prof. C. E. H. Bawn: "Catalysed Oxidation."

Manchester Metallurgical Society

Manchester: Engineers' Club, Albert Square, 6.30 p.m. Dr. B. P. Dudding: "Metallic Materials Used in the Construction of Lamps and Valves."

Institute of Petroleum

London: 26 Portland Place, W.1, 5.30 p.m. Dr. W. W. Myddleton: "Stability of Mineral Oils in Toilet and Cosmetic Preparations."

Institute of Welding

Manchester: Reynolds Hall, College of Technology, 7 p.m. E. F. Burford: "The Design of Pressure Vessels."

THURSDAY, NOVEMBER 9

Royal Institute of Chemistry

Belfast: (Belfast and District Section, with the Chemical Society and SCI). Annual dinner.

Hull: Royal Station Hotel, 7.30 p.m. T. McLachlan: "The Public Analyst and His Work."

Stirling: Golden Lion Hotel, 7.30 p.m. Dr. D. McNeil: "Coal Tar Research."

The Chemical Society

Liverpool: University, 4.30 p.m. (with RIC, SCI and BAC). Prof. F. S. Dainton: "Polymerisation and its Reversal."

Nottingham: University, 6.30 p.m. Dr. L. E. Sutton: "Recent Chemical Applications of Electric Dipole Moment Measurements."

Sheffield: University, 6.30 p.m. (with RIC). Dr. R. J. Holroyd: "Hydrocarbons as Raw Materials for Organic Chemical Industry."

Oil and Colour Chemists' Association

Glasgow: St. Enoch Hotel, 7.15 p.m. G. R. MacFarlane: "Paint Machinery—Latest Developments."

Institution of Electrical Engineers

London: Savoy Place, W.C.2, 5.30 p.m. D. B. Hogg: "Some Notes on Electrical Installations in Large Chemical Factories."

ANALYSTS' CONGRESS

Papers for Paris Meeting

THE Société de Chimie Industrielle, with the collaboration of the Groupement Technique de l'Analyse et des Essais, has now published its programme of the congress of analysts it is organising in Paris from November 20-24.

Among many lectures to be given at the congress is one by a former president of the Society of Public Analysts, Mr. G. W. Monier Williams, in English, entitled "Some Problems of Trace Element Analysis in Foods." Other papers to be read deal with radioactive indicators in analysis, organic reagents in modern chemical and physco-chemical techniques, achieving technical conditions in the laboratory, the applications of X-rays in analysis, and the sensibility of analytical reactions.

Many different laboratories and works will be visited including the Laboratoire Central de l'Armement (section de spectrographie), the Laboratoire Central des Services Chimiques de l'Etat and the Paris municipal laboratory.

NEXT WEEK'S EVENTS

(continued from previous page)

The Royal Society

London: Burlington House, Piccadilly, W.1, 4.30 p.m. The Leeuwenhoek Lecture. Sir Paul Fildes: "The Development of Microbiology."

Institute of Metals

London: Royal School of Mines, South Kensington, 7 p.m. Prof. A. J. Murphy: "The Significance of Some Less Common Metals."

FRIDAY, NOVEMBER 10

Royal Institute of Chemistry

St. Andrews: University, 5 p.m. Prof. E. G. Cox: "Bond Lengths: Their Measurement and Significance."

The Chemical Society

Exeter: Washington Singer Laboratories, Prince of Wales Road, 5 p.m. Dr. R. S. Cahn: "Editing for the Chemical Society."

Bedson Club

Newcastle-upon-Tyne: Dr. E. J. Bowen: "Resonance Transfer of Energy between Molecules."

The Royal Institution

London: 21 Albemarle Street, W.1, 9 p.m. Prof. Gordon F. Hull (Professor of Physics, Dartmouth University, U.S.A.): "Microwave and Optical Analogues."

ROYAL SOCIETY OF ARTS

A Survey of British Progress

"ONE Hundred Years of British Progress" is the title of a series of lectures being given during the present session (the 197th) of the Royal Society of Arts, the inaugural address of which was given last Wednesday by Mr. Ernest W. Goodale, chairman of the society.

Other lectures include: "A Century of British Science," by D. McKie, reader, Department of the History and Philosophy of Science, University College, London, on February 14; "Cities Without Smoke" by Albert Parker, director of Fuel Research DSIR (November 22, 1951); the Fernhurst Lecture "Insecticides and their Study," by C. Potter, head of the Department of Insecticides and Fungicides, Rothamsted Experimental Station (January 10).

Among the Cantor Lectures will be three in January (Mondays 8, 15 and 22) on the "Plastics Industry" by John C. Swallow, of the British Plastics Federation.

International Welding Congress

AN international welding congress is to meet in London and Oxford from July 14-21 next year. It will include the annual meeting of the International Institute of Welding and its various commissions, and is sponsored in this country by the five British member societies—the Institute of Welding, the British Welding Research Association, the British Acetylene Association, the welding sections of the British Electrical and Allied Manufacturers' Association and the Sheet and Strip Metal Users' Technical Association. The president of the reception committee is Sir William Larke.

The congress will open in London on July 14, and will be transferred on the following day to Oxford for the remainder of the session. Visitors are expected to number between four and five hundred. Technical papers to be presented and discussed will include: "The Welding of the Wrought Light Alloys," (chairman, Sir Arthur Smout); "The Welding of Bridges and Allied Structures" (chairman, Professor J. F. Baker, Cambridge University); "Present Trends in British Welding."

A programme of social events and a concluding banquet at the Savoy Hotel, London, will form part of the arrangements and a number of works visits will be paid in the week following the congress.

The Stock and Chemical Markets

WITH the opening of the new Parliament, political factors have tended to influence the markets, which have turned hesitant. British Funds, after earlier gains, have eased, and buying of industrial shares has been more selective than recently. The City argues that the new Chancellor is likely to ask for dividend limitation to be continued in 1951. On the other hand, as higher taxation seems inevitable next year, few companies, in any case, will be able to pay more to shareholders in the future. It is recognised, however, that there are many companies with reasonable prospects of maintaining their dividends, and in most cases their shares offer attractive yields at current prices.

Earlier in the week there was an easier trend in chemical shares, pending news of the Government's plans for the new session of Parliament. Imperial Chemical, for instance, have eased to 42s. 4½d., and Fisons to 27s. 9d. Monsanto were 51s. 3d., Albright & Wilson 30s., while W. J. Bush rose further to 88s. 9d. Laporte Chemicals 5s. units were 10s. 4½d., Boake Roberts, 31s. 6d., Brotherton 10s. shares, 20s. 6d., F. W. Berk were 12s. 6d., and Amber Chemical 2s. shares, 2s. 9d. L. B. Holliday 4½ per cent preference were 19s. 9d. and Woolley 4¾ per cent debentures, 104½.

Dunlop Rubber came back to 63s. 6d. on the company's new capital plans and British Oxygen, which is also making a big increase in capital, were 91s. Several leading industrial companies are expected to require more money before the end of the year for expansion purposes, and also to finance stocks, because of increased prices of raw materials. The market believes that the full British Celanese results, or annual meeting, may provide news of the company's capital plans.

Turner & Newall, at 85s. 6d., showed firmness on talk of higher dividend possibilties, but United Molasses eased to 47s. 3d. after their recent rise. The 4s. units of the Distillers Co. were 19s. 7½d. and Boots Drug showed firmness at 49s. 6d. Lever & Unilever have been steady at 44s., but British Aluminium eased slightly to 43s. 9d. and Associated Cement to 84s.

United Glass Bottle, at 76s. 3d., remained firm and Triplex Glass, at 27s. 6d., regained part of an earlier small decline. Iron and steels were generally steady, with Guest Keen more active around 46s. 9d. and Staveley firmer at 84s. 3d. on the statements at the meeting.

Glaxo Laboratories changed hands around 52s., Beechams 2s. 6d. deferred units were 14s. 6d., British Glues moved up to 21s. 9d., British Match remained at 33s. 6d. and Borax Consolidated have been firm and well maintained at 55s.

British Celanese, at 24s. 3d., were fairly steady, awaiting the full results and chairman's annual statement. Courtaulds have eased to 40s. on some disappointment with the unchanged interim dividend, although this does not necessarily rule out an increase in the final dividend. On the last occasion the chairman pointed out that it was only after much consideration that the directors agreed to continue a policy of dividend limitation.

Oil shares have been uncertain, with Shell at 62s. 6d. and Anglo-Iranian £6 5/16.

Market Reports

FIRM price conditions have characterised most sections of the industrial chemicals market during the past week and such adjustments as have been made have been towards higher rates. Delivery specifications are fully up to schedule and buyers are already showing interest in contract replacement business covering the first half of 1951. Export trade, too, has been fully maintained, especially for Empire destinations. There has, unfortunately, been no improvement in the supply of drums and the acute shortage of containers is still a serious hindrance to export trade. In the coal tar products market the chief alteration is a rise of 9d. per gallon on cresylic acid and it is understood that ADF cresylic is commanding $1.15 per American gal. Phenol is now quoted at 1s. 1d. to 1s. 3d.

MANCHESTER.—Prices have remained steady in the Manchester chemical market with fairly active trading conditions during the past week. Textile dyeing and finishing chemicals are meeting with a good demand and steady pressure for supplies has been experienced from most other leading industrial outlets. There have been a fair number of fresh inquiries for a wide range of products, including the alkalis and the potash compounds. Manufacturers continue to receive a steady flow of orders on both

(*continued at foot of following page*)

Law and Company News

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages or Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

BARCLAY-STUART (PLASTICS), LTD., London, E.C. (M., 4/11/50). October 2. £2500 further charge to English Estates Assurance, Ltd.; charged on land 25 and 27 Brunswick Street, and the site of 16 to 26 Duke Street, Luton, together with buildings and factory premises thereon. *Nil. December 31, 1949.

Satisfaction

LAWRENCE (BRIGHTON), LTD., chemists. (M.S., 4/11/50). Satisfaction October 6, of deb. reg. March 9, 1059.

Company News

Dunlop Rubber Company

Very steep rises in the prices of rubber and cotton have influenced the Dunlop Rubber Company to seek authority to raise fresh capital and to increase its present borrowing powers. An extraordinary general meeting of shareholders on November 13 will be asked to authorise the issuing of any of the 21,650,930 ordinary shares of 6s. 8d., at present unissued, and to fix the total amount which may be borrowed by the parent company at £20 million.

Mixenden Mills, Ltd.

The Mixenden Carbonizing Co., a branch of Henry Cullingworth & Sons (Bradford), Ltd., has been formed into a private limited company under the title of "Mixenden Mills, Ltd." The board has been strengthened by the addition of Mr. R. E. Tranter, who has been manager of the company for 31 years.

Change of Name

The name of HOCKLYKEM, LTD., of 1 Hockley Hill, Birmingham, has been changed to HOCKLEY CHEMICAL CO., LTD.

Increases of Capital

The following increases of capital have been announced: DURHAM CHEMICALS, LTD., from £140,000 to £190,000; ALBRIGHT & WILSON, LTD., from £1.5 million to £5.5 million (THE CHEMICAL AGE, 63, 304).

New Registrations

A. J. Berthier & Sons, Ltd.

Private company. (487,065). Capital £1000. Manufacturers, importers and exporters of essential oils and raw materials for the perfumery trade, etc. Subscribers: E. A. Smee and F. E. H. Smee. Reg. office: 1 Morocco Street, Bermondsey, S.E.1.

Gascoigne-Crowther, Ltd.

Private company. (487,570). Registered October 23. Capital £1000. Dealers in detergents, bactericide, chemicals and chemical products, disinfectants, etc., connected with agricultural or other purposes. Directors: Geo. H. Gascoigne (director of Gascoignes (Reading), Ltd., and Harold A. H. Crowther. Reg. office: 42 Bedford Avenue, W.C.1.

Micro-Nutrients, Ltd.

Private company. (487,361). Capital £100. Objects: To acquire licences and other rights in formulae of all kinds connected with industry, and foodstuffs, agriculture, medicine and the production of micro-nutrients, etc. For other particulars see Micro-Nutrients Holdings, Ltd.

Precipitators, Ltd.

Private company. (487,517). Capital £100. Manufacturers and contractors for all types of electrical and mechanical apparatus and equipment for use in connection with cleansing, purifying and refining of gases and liquids, etc. Directors: E. L. Joseph, K. E. Joseph, A. G. T. Oakley and E. F. W. Cowell. Reg. office: The Esplanade, Rochester, Kent.

THE STOCK AND CHEMICAL MARKETS

(continued from previous page)

home and export account. There has been a brisk demand for most of the tar products, especially the light distillates.

GLASGOW.—There has been a steady flow of business during the past week in the Scottish heavy chemicals market. A large number of chemicals and raw materials have been subjected to very considerable increases in price, in many instances due to the higher cost of paper bags.

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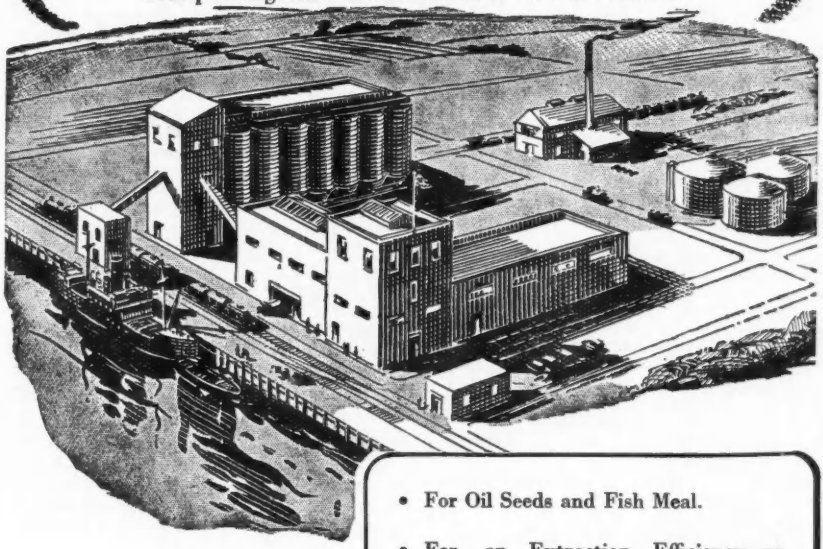

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28/4

Patent Processes in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted will be obtainable, as soon as printing arrangements permit, from the Patents Office, Southampton Buildings, London, W.C.2, at 2s. each. Higher priced photostat copies are generally available.

Complete Specifications Accepted

Preparation of dialkyl-substituted dihalogeno silanes. — British Thomson-Houston Co., Ltd. June 11 1948. 645,314.

Sealing of closures for containers.—Dewey & Almy Chemical Co. June 24 1948. 645,318.

Gas-expanded material and method of making same.—United States Rubber Co. Aug. 25 1948. 645,115.

Manufacture of thiopentone.—Geigy Co., Ltd., I. E. Balaban and B. E. Wilde. May 14 1949. 645,117.

Apparatus and method of making tampons.—H. G. Bouly (International Cellucotton Products Co.). Sept. 17 1948. 645,048.

Conditioning of penicillin.—Soc. des Usines Chimiques Rhonepoulenc. Sept. 17 1948. 645,180.

Densitometers.—Evans Electroselenium, Ltd., and G. C. Collins. Sept. 8 1949. 645,050.

Metallurgical processes for producing materials or articles of platinum or allied metals, or their alloys, and materials or articles produced by or from the products of such processes.—Lodge Plugs, Ltd., and C. J. Smithells. Oct. 24 1944. 645,681, and 645,682.

Manufacture of gypsum cement and building, insulating and other materials prepared therefrom.—Manchester Oil Refinery, Ltd., and V. Weinberg. June 25 1945. 645,821.

Production of cleansing compositions in solid form.—J. Malecki. July 14 1947. 645,752.

Manufacture of cast iron.—British Cast Iron Research Association, and H. Morrogh. June 9 1947. 645,862.

Process for refining hydrocarbon oil.—Separator-Nobel A/B. Dec. 4 1946. 645.826.

Stabilisers for rubber and the like, and the preparation thereof.—Firestone Tyre & Rubber Co. Jan. 2 1947. 645,828.

Separation of niobium from tantalum.—Soc. Generale Metallurgique De Hoboken, and J. P. Leemans. Feb. 18 1947. 645,832.

Method for the production of a catalyst.—Sana. Narodni Podnik. March 18 1947. 645,872.

Electroplating of metallic wire.—Kenmore Metals Corporation. March 18 1947. 645,834.

Production of nitriles.—Socony-Vacuum Oil Co., Inc. July 25 1947. 645,754 and 645,755.

Colloidal solutions of inorganic oxides.—National Aluminate Corporation. July 29 1947. 645,703.

Construction of electric heating mantles. Isopad, Ltd., and H. Reik. Aug. 26 1948. 645,843.

Ignition device for oxygen piercing and cutting lances.—Soc. l'Air Liquide, Soc. Anon. Pour l'Etude et l'Exploitation des Procèdes G. Claude. Oct. 23 1947. 645,757.

Production of phosphatic fertilisers.—L. A. Johnson. Nov. 22 1948. 645,709.

Gas-liquid or liquid-liquid separators.—Hefa National Corporation, and J. Neumann. Dec. 8 1947. 645,710.

Production of elastomers of polyvinyl chloride.—Boothby & Thompson, Ltd., S. Szekely and C. A. Redfarn. Dec. 16 1948. 645,712.

Vitamin-containing products.—Nopco Chemical Co. Jan. 15 1948. 645,854.

Manufacture of pyrophorus and hydrogen-producing compositions.—T. Moklowski. Feb. 26 1949. 645,855.

Nucleon detectors.—J. Sharpe. Jan. 28 1949. 645,891.

Saponification of cellulose acetate textile materials.—British Celanese, Ltd. Feb. 24 1948. 645,761.

Gas-escape reaction propulsion devices.—I.C.I., Ltd., A. C. Hutchinson and M. Wilson. Jan. 28 1949. 645,897.

Thio-ether substituted thiazoles and selenazoles and process of preparing the same.—General Aniline & Film Corporation. March 22 1948. 645,901.

Method of separating esters of octahydrophenanthrene carboxylic acids.—Ciba, Ltd. March 31 1948. 645,765.

Method of rendering fabrics water-repellent.—J. G. Fife. (Dow Corning Corporation). May 11 1948. 645,768.

Moisture-proofing heat-sealing coating compositions, and articles coated therewith.—British Cellophane, Ltd. May 28 1948. 645,914.

Preparation of propylene-diamine.—Carbide & Carbon Chemicals Corporation. Oct. 5 1948. 645,736.

Filters for air and gases.—Air-Maze (Great Britain), Ltd., and T. C. Locker. Sept. 29 1949. 645,654.

Extraction and purification of organic compounds.—W. Ransom & Son, Ltd., and R. A. G. Stockdale. May 11 1948. 645,876.

Manufacture of thiourea.—Koppers Co., Inc. July 15 1947. 645,701.

Amended Specifications

Concentration of acids.—British Celanese, Ltd. 570,903.

Manufacture of chlorocresols.—Imperial Chemical Industries, Ltd., and another. 573,477.

Drying of filaments.—American Viscose Corporation. 584,070.

Method of, and apparatus for, cleaning, rust-proofing, priming and painting sheet metal articles such as vehicle bodies and chassis.—Pressed Steel Co., Ltd., and others. 584,432.

Manufacture of metallisable monoazo dyestuffs of the pryazolone series.—R. M. Hughes (J. R. Geigy Akt.-Ges.). 629,412

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No. 210 One **HORIZONTAL MIXER** as above.

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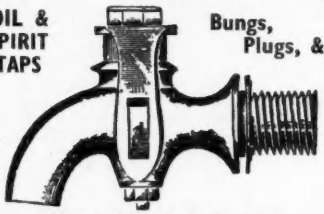
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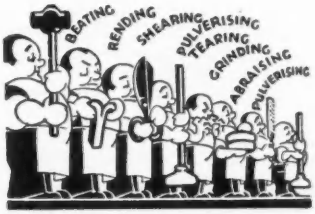

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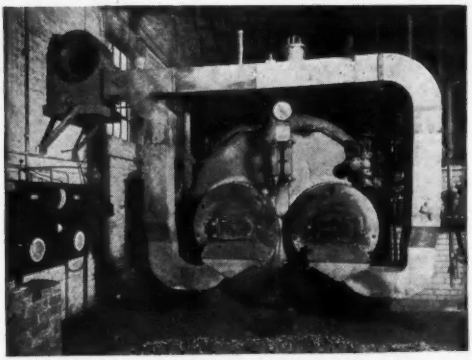

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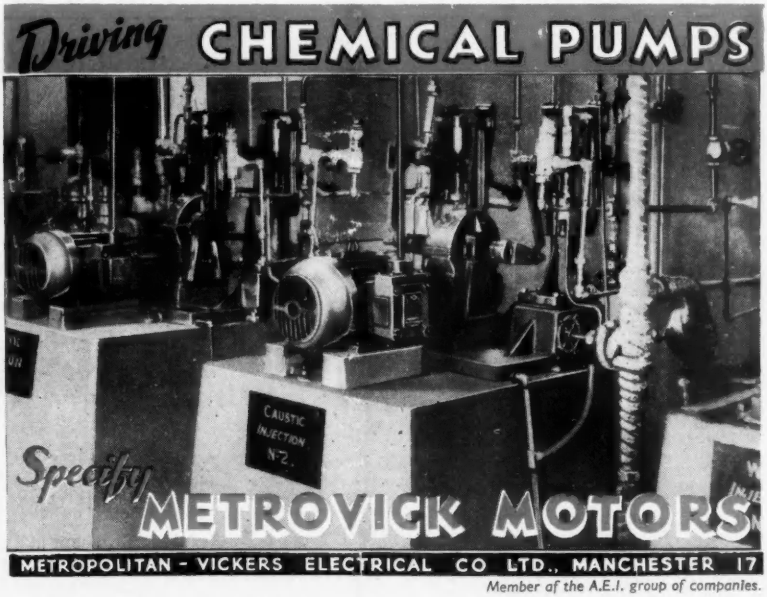

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